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Editorial Notes

Welcome Encouragement

In time of war it is clearly in the national interest to make the best possible use of home-produced substitutes for imported oil ; and the statement made in the House last week by Mr. Geoffrey Lloyd, Secretary for Mines, concerning alternative fuels for motor transport affords much encouragement. He made it clear that within the next five years the Government has no intention of proposing a tax on home-produced coal, coke, or gas when used as a fuel for motor transport. Nor, in the case of services of national importance, has the Government any intention of rationing these alternative fuels. Coupled with this is the welcome announcement that the Government has decided to make concessions in regard to the unladen weight of vehicles carrying the necessary auxiliary equipment for the purposes of taxation and of the Road Traffic Acts. "The Government hopes," said Mr. Lloyd, "that with this encouragement the employment of these alternative fuels will develop and that they will make a useful contribution to our war effort." The Gas Industry will do all possible to further this aim, and it has a very important contribution indeed to make. The Industry has three alternative fuels to offer—benzole, gas, and coke, in the production of which the best use is made of coal.

In the "JOURNAL" of Nov. 1 we analyzed in these columns the position in regard to the use of both compressed gas and low pressure gas for motor transport. Concerning the former we referred in some detail to the recent development work carried out to such a successful conclusion by the Birmingham Gas Department, and pointed out that in certain circumstances even in peace-time the substitution of town gas has been worked out as a reasonable economic proposition. We emphasized that the experimental stage has been passed and that the soundness of the method from a technical and a practical point of view has been thoroughly proved. We now hope that the Government's encouragement will be extended to a lead in regard to the supply of the raw material for the bottles needed for containing the compressed gas. We know of plans on the production side, details of which we are not at liberty to disclose at the moment, which are in a more advanced state of preparedness than is probably generally realized. The Minister's statement last week, though principally linked up with the producer gas system, may well have cleared the air to some extent for the parallel development of the use of coal gas.

Concerning the use of solid fuel for internal combustion engines there has been much activity on the producer front. Some time ago a Committee was set up by the Government to examine the question. Sir Harold Hartley, Chairman of the Fuel Research Board, is Chairman, and the Department of Scientific and Industrial Research, the Ministry of Transport, the Mines Department, and several road transport operating companies are represented on it. The efforts of this Committee have led to the design of a gas producer on which high hopes are placed. On Thursday last this producer, attached to a London Transport 'bus, was demonstrated and on the same occasion fifteen other vehicles fitted with gas producers were inspected. An account of the demonstration will be found in our issue to-day. It was stated that the Committee's work has shown that low-volatile anthracites and certain low temperature cokes are suitable fuels and that research is proceeding in the hope of widening the range of fuel. Many times during recent years the "JOURNAL" has suggested that the Gas Industry should investigate the possibilities of producing reactive coke suitable for use in producers designed for motor transport. In the "JOURNAL" for Oct. 25 last, we spoke of the large amount of work which has been carried out on the production of reactive cokes and of the quantity of information available. The Industry could have done more to connect this work with the supply of coke for motor transport, for it should not prove a difficult task for the Industry to produce fuel meeting the requirements of the producer gas vehicle as regards coke analysis, reactivity, and size. We are thinking in terms of the producer gas plant as developed to date.

There is another and very important aspect of the problem which also calls for the co-operation of the Industry with other bodies interested in the development of producer gas driven vehicles. It is to be hoped that, following upon the Government's encouragement, the manufacturers of producer plant will carry out more intensive experiment aiming at the design of a plant which will deal with less reactive fuels. Is it too

much to hope that a type of plant will be forthcoming which will deal satisfactorily with coke breeze? The price at which such a fuel could be obtained would obviously be a great attraction. The producer gas plant problem should not be attacked only from the one angle of making the fuel fit the plant. The other line of approach should be pursued—that of designing plant which will fit the fuel.

Reduction of Sulphur Compounds

THE most economical form of heating by gas is by burning it fluelessly. Care has to be exercised in seeing that the gas rate is suitably adjusted and controlled. Granted this, and provided the gas supplied is of satisfactory quality, this type of heating can be recommended with confidence, and obviously its sphere of usefulness is all the greater under wartime conditions. Now by "satisfactory quality" we mean a gas with a low sulphur content—the lower the better, for sulphur is the bugbear of flueless heating. Ten grains of sulphur and less should be the aim; and that this aim can be accomplished without technical difficulty and at no great works expense even on a small works was clearly demonstrated by Mr. Norman Hudson in his recent Paper to the Manchester District Association of Gas Engineers, in which he set out the results of the operation of his benzole and sulphur extraction plant at Mirfield. The results are wholly encouraging, and the Author's enterprise and that of his Company will, we are sure, be well repaid. Nor are the financial benefits confined to the manufacture of such a gas. Its quality opens up a wide field of usage, it has prolonged the life and reduced the maintenance costs of appliances and improved their appearance in use, and the operation of the plant has obviated gum troubles on the district. Altogether an excellent bill on the credit side, to which must be added increased consumer goodwill.

Adequate maintenance and servicing of appliances is a necessary item in enabling the consumer to use his gas supply to the best advantage, but it costs money—and with a gas supply of high sulphur content an unnecessarily large amount of money. In this regard Mr. Hudson mentioned as one example an instantaneous water heater which, prior to sulphur extraction, required servicing twice a year. Since gas has been sent out containing no more than 10 grains of total sulphur per 100 cu.ft. satisfaction has been given to the consumer by servicing once every twelve to fifteen months—a period which, it is confidently expected, can be extended to eighteen months. Under present conditions this is very important. Extended periods of servicing mean not only lower costs but also fewer men to undertake the work.

For war requirements washing for benzole recovery is now the order of the day. We have heard the view put forward that, while it is incumbent on gas undertakings to wash for benzole, extraction of sulphur in present circumstances is quite a secondary matter. To this view we cannot in the least subscribe. Wartime conditions lend not less, but greater, importance to this question of sulphur reduction. The pros far outweigh the cons. At small works cost gas can be supplied which will result in longer life of appliances and reduced maintenance charges. We have striven hard to secure the goodwill of the consumer; we must continue to put forward our best efforts towards this end in time of war. It must be borne in mind, too, that the advantages of sulphur removal do not lie solely in the sphere of domestic gas supply. Sulphur extraction has made it possible to obtain large industrial loads which, with gas of high sulphur content, would have been unattainable. During the discussion on Mr. Hudson's Paper Mr. MacKay cited his experience at Stoke-on-Trent, where the necessary steps have been taken to supply a low organic sulphur content gas. These steps have provided the means for increasing sales to the manufacturers of pottery. Six years ago there were two kilns accounting for a consumption of 40 million cu.ft. of gas. To-day, thanks to a low-sulphur gas, there are some 66 kilns in operation consuming 1,400 million cu.ft. "Sulphur must go" must not be regarded as a slogan appropriate only to peace-time.

More Standardization Needed

WE have referred several times in these columns to the need for a greater measure of standardization of gas fittings, equipment for supply, and gas consuming apparatus. It would be to the benefit of the supplier of gas, of the manufacturer of apparatus, and also of the gas consumer. The question has met with considerable ventilation this year, notably at the Joint Gas Conference held in Birmingham last March, and at the Conference in April, of the British Commercial Gas Association. We turn to the matter again because war conditions have brought added importance and greater urgency to it. There is to our mind little doubt that much could be done to solve the problem if a serious attempt was made by gas undertakings in co-operation with the manufacturers of equipment and appliances. We do not for a moment suggest that every manufacturer should make one type of article. That would prove a bar to progress. We do not want to see the establishment of close specifications of appliance design; what is needed is the avoidance in a given design of individual requests for slight modifications—modifications all too frequently the expression of personal whim. The majority of these variations do not affect the efficiency of the appliance in the consumer's premises, and the point of view of the manufacturers has been put forward that a greater appreciation of manufacturing difficulties and costs which would enable them to maintain their standard product would be in the best interests of the industry. Unnecessary individual demands by gas undertakings are costly and defeat the effort made to keep down costs. It is essential, as we have pointed out on several occasions lately, that gas undertakings shall revise as quickly as possible their present gloomy outlook on the question of appliance sales. It should be unnecessary to remind them that the elimination of the demand for finicky variations can help the manufacturers of appliances very substantially in keeping down the cost of the excellent standard designs they produce.

Some time ago Mr. G. E. Currier, of Bradford, in a letter to the "JOURNAL" indicated the position in regard to meters. He referred to the variety of meters in the sizes most largely used which have to be stocked by manufacturers to meet the requirements of gas undertakings—the light type, standard high capacity, and small case high capacity, in their various sizes, each stocked as open top meter and closed top meter. Further, prepayment meters in these types have to be stocked as single coin meters at 1d. and 1s., duo coin at undertaking's option, and optional at consumer's option. This is not a comprehensive list, but it does demonstrate the need for co-operation between gas undertaking and manufacturer and for a greater measure of standardization—a need, as we have said, all the greater now we are at war, when we are called upon to exercise economy and eliminate waste. On the question of specifications many useful national specifications have come into being, but in many industries, the Gas Industry included, there is still a tendency towards duplication. It would facilitate production methods and effect a reduction in manufacturing costs if such duplicated specifications were combined into national specifications. The economies which could be effected in storing and maintenance should also be considered. More standardization on agreed lines would help the Industry to give the best service to the consumer under wartime conditions.

Breaking the Silence

WITH the publication in to-day's "JOURNAL" of the Presidential Address of Mr. F. O. Hawes to the London and Southern District Junior Gas Association, the "silence" of

the Junior Associations since the outbreak of war has been broken. True, the London Junior Association occupies, perhaps, a unique position in that a sufficient number of members to make meetings possible live in or close to the Metropolis, and many are engaged on large undertakings a proportion of whose technical staffs can be released to attend meetings even in times like these. The meeting was held in camera "somewhere in London"; nevertheless, it was a move towards some resumption of useful activities, albeit on a restricted scale.

Referring to this matter, Mr. Hawes quoted the observations of a member of the Council who declared that, if ever the interchange of experiences and of technical information was of value, surely it is now, when we might all be faced with conditions and emergencies of a nature outside our previous experience. Moreover, complete closure was a species of defeatism which did not appeal to the members of the Council present. Therefore, this meeting was resolved upon as an experiment to ascertain how much support was forthcoming. The response evidently justified the experiment, for the Association intend for the present to carry on more or less on the lines of discussion groups—at which there will be no set papers, but at which views and experiences on the widest scale will be ventilated to the mutual benefit of those present.

In expressing these views, Mr. Hawes emphasized that his remarks should not be interpreted as a criticism of organizations which have thought it expedient to cease their activities for the time being. As we have pointed out, the London and Southern District Junior Gas Association occupies a unique position as regards the ability of members to attend meetings. We would, however, reiterate our previously expressed observations on the part the "JOURNAL" can play at the present time. Through these columns, those who are prevented by existing circumstances from taking part in technical gatherings can exchange views and experiences of value to the Industry as a whole.

Quality Control

NOT so very long ago we often heard gas engineers rather priding themselves that the gas they supplied was well above the declared calorific value—that they were giving the consumer good measure while safeguarding themselves fully in regard to the requirements of the Gas Regulation Act. A B.Th.U. here or there does matter, however—a fact which was well brought out by Mr. Hawes in his Address. He referred to the practice at Tottenham during the first year or two after the passing of the Act, of supplying a gas of 504.5 B.Th.U. with a declared value of 500 B.Th.U.—that was prior to the introduction of recording calorimeters. The availability of continuous records, however, enabled much closer working, and for many years the quarterly average has been below 501 B.Th.U. The excess of the average value over the declared value has, by this finer control, been reduced by about 3.5 B.Th.U. per cu.ft. On an output of some 4,000 million cu.ft. per annum this represents a saving of about £5,000 taking the price of gas at 8.6d. per therm—the price operating until recently. The cost of effecting this close control has, of course, to be set against this figure of £5,000. But Mr. Hawes gave an estimate, which he considered generous, of £1,000, which shows how in this one direction alone how careful control of gas-making pays. This control has also resulted in very great regularity of operating, with all its attendant advantages in wear and tear of plant.

It is well known, too, that the Tottenham Company has paid considerable attention to another aspect of gas quality—that of combustion characteristics, the importance of which has come so much to the fore of late. Stress of war conditions may force upon many undertakings changes in manufacturing methods, reductions in declared calorific value, and so on. Under these conditions it becomes more than ever necessary to keep an eye on combustion characteristics and maintain them within a range which will not impair the performance of gas at the consumer's burner. To our mind, study of combustion characteristics is the type of research which should be continued in war, and those responsible for gas manufacture and supply should acquaint themselves fully with the work which has been done on the subject. It has been shown, notably at Tottenham, that much valuable information regarding combustion characteristics can be obtained using quite simple equipment. At Tottenham a modified Ott burner was used—a simple burner with a graduated air slide. The chief danger accompanying alteration of combustion characteristics is lighting-back, and the Ott burner does act as a reliable guide as to what may be expected.

The latest report on the subject of combustion properties was that of Dr. A. E. Haffner as First Arthur Duckham Research Fellow. An abstract of the report (Communication No. 202 of The Institution of Gas Engineers) was published in the "JOURNAL" of May 24 last. It will be recalled that the main properties of 20 synthetic mixtures which represent almost all types of gas likely to be distributed as British town gas were determined. Of particular interest now are the results recorded in that report of investigation on the combustion properties of mixtures of coal gas and carburetted water gas and on the effects of benzole recovery; and we suggest that the report should be studied anew at the present juncture.

"Business as Usual"

THAT time-worn cliché, "Business as Usual," so popular during the last war and resurrected to some extent since the outbreak of the present conflict, is regarded by many as impossible of achievement in existing circumstances. Be this as it may, it is surely an ideal to be aimed at, even though the slogan has to be accompanied in parenthesis by the proviso "so far as possible." It will hardly be suggested that any organizations can carry on quite as usual; but so far as the Gas Industry is concerned, apart from our participation in vital national services, there is ample evidence that works development programmes are being pushed forward in order to meet our obligations to our consumers. A glance through the pages of the "JOURNAL" since the outbreak of hostilities indicates that decisions to go ahead with comprehensive extensions have not been countermanded as a result of present conditions, while a number of new schemes of development have been formulated and put in hand.

To quote just a few examples of which we have been notified; Doncaster has sought powers to borrow £9,000 odd for the erection of new works offices and a gasholder; a vertical retort installation, estimated to cost more than £60,000, is to be erected at Peterborough; Newcastle-under-Lyme intends to go forward with a scheme for the purchase of coke oven gas in bulk; Newark seeks a loan of £6,000 towards the purchase of gas appliances and the provision of new services, as well as the installation of a water gas plant; Ennerdale requires £14,000 for work in connexion with a bulk supply from Workington; Wallasey has applied for a grant of £3,500 for extensions to compressing plant; schemes estimated to cost £150,000 have been recommended by the Birkenhead Gas Committee, including £57,000 for carbonizing plant and £71,500 for a new holder; the Nottingham Gas Committee recommend the Council to raise £150,000 for the purpose of general extensions to the city's gas services; Blackburn is seeking powers to borrow £10,000 for the gas undertaking; while many undertakings are putting down additional water gas plant.

These contracts—probably but a percentage of the whole—represent an aggregate expenditure of not far short of half a million pounds; and while a small proportion of this sum may reasonably be attributed to meeting war-time contingencies, the bulk of it may be regarded as normal expansion and development work. It may be argued that the Gas Industry is compelled to carry on so far as its obligations to supply gas to its consumers are concerned, and therefore that there

is no particular cause for self-congratulation. Such a contention, however, detracts in no measure from this indisputable evidence of the Industry's enterprise and faith in the future. It indicates, moreover, not only the Industry's faith in its own future, but also a refusal to be deterred by any defeatist attitude.

Praiseworthy as is this evidence of a continuation of activity, it concerns, in the main, work on the production side. It is only one side of the picture. We have, it is to be hoped, satisfactorily established by now that profits are not made solely in the retort house or solely on the district. Both are vitally concerned if the Industry is to progress; and, as we have pointed out on previous occasions, the continued sale of gas appliances in war-time is not only a proper national service, but is essential to the continued existence of the Gas Industry itself and of the manufacturers who have devoted immeasurable capital, research, and enterprise to the development of a market that would be closed to them if appliance sales were suspended.

We have commented on the manner in which the Women's Gas Council and the Home Service Departments of gas undertakings are adapting their functions to war-time conditions so as to ensure little, if any, slowing down of their normal activities. But such activities must essentially go hand in hand with appliance sales—and every reasonable facility should be given by gas undertakings to enable consumers to acquire the appliances necessary to burn the gas, whether in additional quantities in substitution for raw coal, or in a more economical manner through replacing out-of-date apparatus by the most modern types.

Thus will the Gas Industry, by a continuance of its normal functions—not only on the works but on the district as well—assist in no small measure to keep the wheels of internal trade revolving, which is as essential to the successful prosecution of the war as is the maintenance of our trade overseas. But the continuance of activities must not be confined to any one branch of the Industry to the exclusion of others.

War on the Home Front

One can well appreciate the feelings of the Workington Corporation on the subject of hurricane lamps. They probably regard it as adding insult to injury that attention to German made lamps used to illuminate traffic islands should have cost them 114 hours' overtime during the past five weeks. This is doubtless another example of the insidious work of the German war machine. Just as Mr. Chamberlain's attack of gout was an alibi under cover of which the Prime Minister, in company with the Archbishop of Canterbury, slipped across to Munich to do a little bombing, so have badly designed hurricane lamps of German origin been smuggled into the country in order to disorganize the operations of local authorities and cause countless hours' overtime! We welcome the move of the Workington Corporation to experiment with gas lighting for their traffic islands, and feel sure that this method will prove more effective and give rise to much less trouble than lamps of German make. In any case, it would seem a paradoxical situation that people should have to rely on illumination from units of enemy origin, presumably burning foreign oil, when a far more reliable source, involving the use of all-British lamps and fuel, is available.

Telling the Public

In the current issue of the *Electrical Review*, a tribute is paid to the manner in which the London gas companies "took the public into their confidence" prior to the recent announcement of a 2½d. per therm increase in the price of gas. At the same time a suggestion is made that if electricity suppliers are forced to follow suit some similar explanation should be given of "a very unpopular move." As an indication of our sister industry's measure of understanding of the difficulties which face us both at this time, we quote our contemporary's comments on the matter.

"One day last week (observes the *Electrical Review*) practically all the London daily newspapers carried a prominent advertisement by the London gas companies explaining exactly how the war had affected their business and why their costs had risen substantially. Very shortly afterwards it was announced that the price of gas in London had been raised by 2½d. per therm, and it was hinted that developments might compel the companies to go even further in the future. We mention this matter not to rejoice in the fact that the price of gas has had to go up, for this natural wartime tendency will doubtless influence electricity charges. It is the way in which the gas companies took the public into their confidence rather than merely putting up the price in a "take it or leave it" manner. If electricity suppliers are forced to follow suit we think that it is due to *their* public to give some word of explanation for a very unpopular move and thus retain the goodwill which successive price reductions have built up."

As in 1871 so in 1939

Exaggerated fears are on occasion expressed by the public regarding the dangers of explosions at gas-works and on the district as a result of enemy attack from the air. We wrote thus on Oct. 25, introducing some comforting references to the experiences of British gas undertakings in the years 1914-18.

On another page of our issue to-day we go even further back. Mr. Thomas Carmichael was recently browsing on ancient literature, and very kindly called our attention to a comment he made in the "JOURNAL" in August, 1871, when Paris suffered bombardment at the hands of the Prussians. Having on that occasion recorded various alarming happenings which were entirely unattended by disorder, even to the stopping of nine holes in one gas holder by servants of the Gas Company with "plugs prepared for such an emergency" (the then equivalent of A.R.P.), we recorded the hope that "these incidents will set men's minds at rest *for ever* as to the supposed dangers of gasholders."

None of us particularly wishes to pit a holder full of gas against an enemy H.E. bomb, but Mr. Carmichael agrees with us that all evidence available from the wars of the past is encouraging, and can simply be used to dissipate the fears of the lay population.

Personal

Mr. G. J. JACKSON, Managing Director of the Woodall-Duckham Company, is leaving this week for South Africa in connexion with a large contract for coke oven and by-product plant received by the Company from the South African Iron and Steel Industrial Corporation, Ltd.

* * *

Mr. J. J. MERRELL, Engineer and Manager of the Sutton-in-Ashfield Urban District Council Gas Department, has retired.

Obituary

The death of Major G. L. BENNETT, J.P., of Bargate, Grimsby, took place on Nov. 5. He was a Director of the Great Grimsby Gas Company.

* * *

Mr. A. DICKSON passed away suddenly on Nov. 6 after only 24 hours' illness. He was Secretary of the Bombay Gas Company from 1906 until his retirement in 1933.

Forthcoming Engagements

Nov.

17.—Southern Association.—Special Meeting of the General Committee, Gas Industry House, 11.30 a.m.

20.—L.C.C.A.—Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 2.30 p.m.; at 1, Grosvenor Place, S.W.1.

Dec.

7.—S.B.G.I.—Meeting of Emergency Committee, Banbury, 2 p.m.

8.—I.G.E.—Joint Committee on Complete Gasification Under Pressure, Gas Industry House, 2.30 p.m.

12.—B.G.F.—Fifth Annual General Meeting, Gas Industry House, House, 10.30 a.m.

News of the Week

Following the Increased Cost of Coal, a rise of approximately 10% is to be made in gas charges by the Thornton Cleveleys Gas Department.

Experimental Gas Lighting is to be provided by the Workington Gas Department on five traffic islands in the town owing to the unsuitability of German made hurricane lamps previously used on the islands. Attention to these lamps during the past five weeks has cost the corporation 114 hours' overtime.

It is the Intention of the Stockport Gas Department to apply to the Board of Trade for a Special Order under the Gas Undertakings' Acts, 1920-34, for the purpose of extending the limits of supply to include a number of additional parishes in the rural district of Macclesfield; also to modify the limits of supply in certain other respects and to make provision as to the price which may be charged for gas.

Sanction has been Received by the Workington Gas Department to a loan of £1,902 from the Ministry of Health for carrying out extensions to the gas plant so that a supply of coke oven gas can be given to the Ennerdale Rural District Council. As reported in the "JOURNAL" at the time, the Ennerdale Council applied about a month ago for sanction to a loan of £14,542 to cover the cost of mains and main-laying.

In Our Issue of Nov. 1 reference was made to an application by the Conway Gas Department for sanction to borrow £5,500 towards the installation of a Humphreys and Glasgow water gas plant. We regret we were misinformed on this matter; it is actually the Colwyn Bay Gas Department which is proposing to put down an H. & G. water gas set and not Conway, where the undertaking is, of course, the Conway Gas Company.

The Purchasing Officers Association has established wartime headquarters at 5, Pierrepont Street, Bath, so as to keep in touch with the large number of members whose businesses have moved towards the West Country. The Secretary, however, has retained a private office in Westminster where he can meet members by appointment. The Council of the Association has decided to continue the essential activities during the war, in the conviction that under present circumstances the services it can render to buyers are more needed than ever. Their supply problems are increased and the opportunities of mutual assistance provided by the Association are correspondingly more valuable.

Owing to the Increased Price of Commodities the Stewarton Gas Light Company have increased the price of gas by 5d. per 1,000 cu.ft. as from the November quarter.

The Output of Gas during September by the Retford Gas Department showed an increase of 76,000 cu.ft. over the corresponding period of last year, the amount sent out being 8,512,000 cu.ft.

A Special Order under the Gas Undertakings' Acts, 1920-34, is to be applied for to the Board of Trade by the Haverfordwest Gas Department to empower them to make certain financial provisions to enable them to carry on and develop the undertaking.

West of Scotland Lighting Experts attended experimental tests for street lighting in Motherwell and Wishaw on Monday. The tests were with shaded blue lights which illuminate the streets, but which, it is claimed, cannot be observed at a greater height than 200 or 300 ft.

The Screened Gas Street Lighting which has been devised at Bolton was inspected last week by the Town Clerk, the Chief Constable, and members of the Emergency Committee. The Lighting Superintendent was subsequently asked to arrange for further tests to be carried out on roads more built-up than that where the experiments were sited.

War-Time Cookery Demonstrations, featuring special wartime menus, are to be organized by the Leamington Priors Gas Company from Dec. 4 to 8. According to a displayed announcement which has appeared in the local Press, Radiation and Flavel cookers will be used at these lectures, the first of which will be opened by the Mayoress (Mrs. Martin S. Moore).

The Annual General Meeting of the Institute of Vitreous Enamellers will be held at the Midland Hotel, Birmingham, on Nov. 30, at 2 p.m. The main business of the meeting will be the induction of the President and election of officers, the presentation of the annual report for the past year, a discussion on the future activities of the Institute during the war, and a review of the Joint Technical Committee publication "Recommended method of testing acid-resistance enamels." Immediately prior to this meeting, an informal luncheon will be held at the Midland Hotel. The Council has appointed a Special Sub-Committee to investigate the continuance of the research work.

Letters to the Editor

Meters and Unaccounted-for Gas

SIR,—During the discussion on the admirable Paper presented by Mr. Felton, of Ludlow, at the meeting of the Wales and Monmouthshire Association of Gas Engineers, dealing with main connexion and unaccounted-for gas, Mr. Jackson, of Neath, remarked that a large percentage of unaccounted-for could be traced back to the meters.

Having no knowledge of mains, services, &c., I venture no comment, but I heartily endorse the view that meters are a greater cause for anxiety.

If the question of non-registration of meters was investigated more thoroughly, we should find that meters would not be allowed to remain on the district for 20 years or more without attention. A good meter may last this period, but it invariably needs some attention in the meantime. We often hear of a meter being accurate on the test bench after more than 20 years' service, but would it be correct under district conditions where, no doubt, it would be working beyond capacity, as so often happens?

Referring to Mr. Butterfield's comments on the conditions under which meters were manufactured in the Great War, I can say that alterations in design have obviated one of the main difficulties. This is a definite fact in the case of the firm I serve and is, I believe, applicable to all makers of repute. Further, there is little doubt that research in connexion with leather dressing has meant that in most cases makers use a dressing to withstand the full range of varying qualities of gas supplied. In connexion with the type of diaphragm dressing used, oiling devices, mechanical and manual, can be fitted to meet every circumstance. We have looked ahead and the gas engineer can rest assured that we will give of our best and do not anticipate that there will be cause for complaint.

There is so much that can be said, and proved, in regard to the accurate registration of meters under all conditions that space would not permit me to deal fully with the matter; but, knowing the importance of "unaccounted-for" gas, I should be pleased to take part in any discussion likely to lead to an improvement in the position.

Yours, &c.,
A. E. ADAMS.

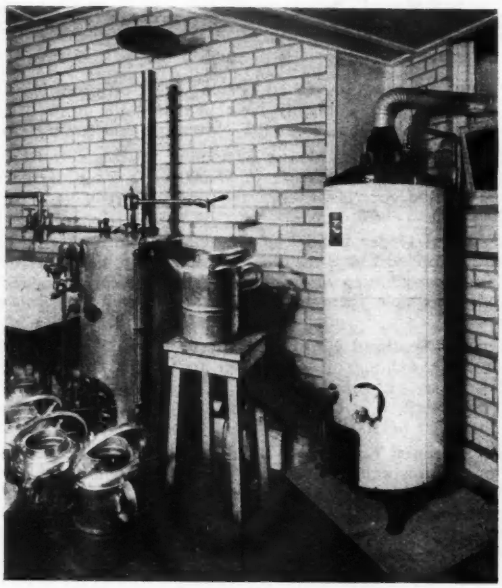
Certus Works,
London.
Nov. 6, 1939.

Shutting Off Gas Mains

SIR,—I am sorry to have to draw your attention to an error in the letter inserted in this week's issue of the "JOURNAL," in reply to Mr. Haseldine's communication in your previous week's issue. The word "close" in the second last line of the second paragraph has been misread and should be "loose," as reference to my letter will indicate. This is somewhat unfortunate, as the inclusion of the word "close" is more or less inclined to support Mr. Haseldine's argument, whereas the word "loose" conveys the entirely opposite interpretation.

Yours, &c.,
A. G. R. KENNETT.
District Superintendent.

Isle of Thanet Gas Light and Coke Company,
Margate.
Nov. 9, 1939.



"PREPARED"

RECENT events have brought home to us what wealth of meaning there is in the word "Prepared"—to be able to cope with any emergency which might arise. This applies to every sphere of business, and it is quite apparent that the Gas Industry is definitely playing its part to meet any emergency.

The above photographs depict an emergency kitchen in Portsmouth which was fitted up in less than 84 hours from receipt of the initial order. The kitchen was a laboratory attached to a large school, and within the time specified 300 men were enjoying their first meal under the new conditions.

Notwithstanding the Gas Company's readiness to deal with the application, the problem was not yet solved. The Company in turn were dependent on another section of the Industry, —namely, the manufacturers of the apparatus which was required. In response to two telephone enquiries to Warrington and London it was learnt that they, too, were "prepared" to give the necessary service, and in less than 24 hours the whole of the apparaus was actually delivered in the building. In one case this meant the loading up and transport of apparatus nearly 250 miles, which speaks well for the manufacturers.

Two fitters were responsible for the installation, and they, too, worked with the same zeal to complete the transformation of this school laboratory into what is now an up-to-date hygienic kitchen capable of catering for 400 persons.

Alternative Fuels for Motor Transport

Replying to Mr. Attlee (Limehouse, Lab.), who asked whether a statement could be made about alternative fuels for motor transport, Mr. G. Lloyd, Secretary for Mines (Birmingham, Ladywood, U.), said in the House on Wednesday last: In time of war it is clearly in the national interest to make the best possible use of home-produced substitutes for imported oil. Among these are certain fuels which can be used to operate existing road vehicles —namely, coal gas or methane carried in gas balloons or compressed in cylinders, and producer gas which is actually generated on the vehicle during the run. There are considerable technical difficulties in adapting producers to burn raw coal or coke for driving motor-vehicles, and, in view of the importance of solving them, a Committee of scientists and road operators was set up by the Government some time ago. They have carried out exhaustive work in the laboratory and under commercial conditions on the road, and I am glad to say that their persistent efforts have now resulted in a design of producer which can be recommended for manufacture. The Fuel Research Station's work has shown that low volatile anthracites and certain low temperature cokes are suitable fuels, and research is proceeding in the hope of widening the range of fuel.

No Tax for Five Years

In order to stimulate the use of these fuels the Government have decided that various uncertainties in the fiscal and general position should be removed, and I am authorized to give certain assurances. First, to meet fears that the Government might propose a tax on home-produced coal, coke, or gas when used as a fuel for motor transport, I can assure the House that, so far as the present Government are concerned, there is no intention of proposing such taxation within the next five years. Secondly, in the case of services of national importance, the Government have no intention of rationing these alternative fuels. Thirdly, since the weight of the auxiliary equipment is included in the unladen weight of vehicles for the purposes of taxation and of the Road Traffic Acts, the addition of this equipment will, in some cases, put the vehicle into a higher licence duty category and a lower speed limit category. The Government have decided to make concessions on these points and my right hon. friend the Minister of Transport is taking the necessary steps, in consultation with the Chancellor of the Exchequer, to give effect to these decisions.

The Government hope that with this encouragement the employment of these alternative fuels may develop and that they will make a useful contribution to our war effort.

Question of Price

Replying further to Mr. Attlee, Mr. Lloyd said the question of price was under active consideration at the moment. The Chancellor of the Exchequer was taking immediate steps with regard to negotiations on the question of unladen weight.

Mr. G. Hall (Aberdare, Lab.).—Is the hon. gentleman's Department extending its inquiries into these alternative fuels, particularly the erection of further plants for the production of oil from coal?

Mr. Lloyd.—Yes, Sir, that matter is under active consideration.

Mr. Ellis Smith (Stoke, Lab.) asked whether the design of the apparatus brought out by the committee of scientists would be available to everyone in the country; and, secondly, what was the cost of conversion from petrol to producer gas when this apparatus was installed.

Mr. Lloyd.—Yes, Sir, this design will be made freely available to all firms who are willing and able to undertake the manufacture, but I would not like to give an estimate of the cost.

Perth's Annual Whist Drive and Dance

A company of over 200 employees and friends attended the fifth annual whist drive and dance of the Perth Corporation Gas Department held in York House, Perth, on Nov. 10.

Mr. A. C. Rea (Gas Engineer and Manager), in addressing a welcome to the company, said that slightly more gas had been used since rationing came in than for the corresponding period last year, notwithstanding the loss of all the street lighting. They had put in additional stocks of coal and had a large quantity of coke available so that there should be no shortage of either.

Prior to the presentation of the prizes by Mrs. Rea, the company was addressed by ex-Bailie A. Gowans, Gas Convener. A vote of thanks was accorded on the call of Mr. G. Davies (Distribution Superintendent).

The Bombardment of Paris in 1871

Effects on Gas-Works

The following excerpt from the "JOURNAL" of August 1, 1871, is of peculiar interest to-day in view of the apprehension still felt in some quarters as to the possible effect of war damage to gas-holders.

"As regards the damage done to the several works in the course of the bombardment," we wrote then "we have some valuable details which we must put on record here for the information of those who persist in believing in the danger of stores of gas. The Governor of Paris entertained a notion of this sort, and thought the works at La Villette were dangerous to the fortifications in the vicinity. The Company assured him that there was not the smallest risk. 'If,' they said, 'a projectile made a hole in a gasholder and set fire to the gas, the gas would simply burn out as a jet of flame. The constant pressure of the gas-holder would effectually prevent any access of air, and therefore there could be no such thing as an explosion.' This happened exactly at Ivry. A shell pierced the gasholder, and lighted the gas. There was a huge jet of fire for eight minutes, the holder slowly sank, and all was over.

"A more curious incident occurred at La Villette. Here a shell penetrated a gasholder and burst in the interior without igniting the gas. Nine fragments made their way out in different directions; but the servants of the Company, with great coolness and dexterity, stopped the holes with plugs, prepared for such an emergency, and so saved the greater part of the gas. At La Villette, also, a shell perforated the bell of a governor, and set fire to the gas; but there was no explosion. The fire was promptly extinguished, but the furniture in the office was destroyed by the explosion of the shell. At Vaugirard, where a great number of shells fell, only one penetrated a gasholder, and here again there was neither ignition nor explosion.

"These incidents, it is to be hoped, will set men's minds at rest for ever as to the supposed dangers of gasholders."

Gas Furnace for Rivet Heating

In the assembling of motor truck chassis large numbers of white hot rivets are used, and adequate heating methods are essential to economic and efficient working.

For this purpose Messrs. H. W. Crouch Pty., Ltd., Sydney, Australia, have adopted a gas-fired furnace which was designed, manufactured, and installed by the Australian Gas Light Company with the collaboration of Messrs. Crouch's technical experts. The use of flexible hose makes the furnace readily portable and it is moved to any part of the shop as required.

The working temperature is approximately 1,100° C. Compressed air at 100 lb. per sq.in. is available in the shop to operate the riveting hammers and this air is used on the furnace after being broken down by means of a special reducing inspirator, to 1 lb. per sq.in. The plant has proved of considerable benefit to the works.

New W.-D. Plant for Peterborough

The Peterborough Gas Company has contracted with the Woodall Duckham Vertical Retort and Oven Construction Co. (1920), Ltd., of London, for a complete instaliation of continuous vertical retorts with coke grading plant. Construction work began this week.

The installation will consist of a bench of 16 independently controlled retorts heated by means of three producers, while provision is being made for an ultimate extension to 24 retorts. With a throughput of 133 tons, the present bench will be capable of producing more than 2 million cu.ft. of gas per 24 hours and represents the very latest design in carbonizing practice.

It is a matter of some difficulty to house in an attractive and yet economical manner the somewhat irregular shapes combined in a completely equipped modern carbonizing plant. By careful design and balancing of voids, wall spaces, and vertical faces, however, an attractive result will be obtained at Peterborough, and at the same time ample light and good ventilation will be ensured.

The foundations for the new plant are now being laid, and it is hoped that it will be at work in twelve months' time.

Cambridge Recreation Club Meeting

The excellent attendance at the Annual Meeting of the Recreation Club connected with the Cambridge University and Town Gas Light Company showed that members have no intention of allowing the activities to lapse.

The various reports provided a complete survey of the year's events, and showed that a very full programme of social and sporting activities had been completed. The darts team had become the first winners of the Social Clubs' League, and the Hunter Rioch Cup, presented by the Engineer and Manager, had been won by Mr. F. Woolard. Visiting Ipswich, the bowls team had brought home the Inter Gas Companies' Shield, and also retained the championship of the Cambs. and District League in keen competition with local clubs. The Athletic section had again a proud record, one of its members, Mr. L. East, holding the Junior County championship. The other sections had all enjoyed a good season. Financially, the Club's position had been strengthened since last year, as the treasurer's statement revealed.

All members of the Club serving with H.M. Forces are to receive a Christmas parcel, and although, in view of the present circumstances it is not possible to arrange many of the customary functions, it was decided to hold the Children's Party if the rationing order permitted. It was also agreed to install a wireless set in the clubrooms.

Officers were elected as follows:

Chairman, G. E. H. Keillor; *Vice-Chairman*, W. H. Wosencroft; *General Secretary*, H. G. Kirby; *Treasurer*, W. D. Robinson; *Minute Secretary*, S. Halls; *General Committee*, A. Bowman, E. Elderkin, J. Matthews, V. Northfield, H. Thirkettle, and A. E. Stallan.

Gas Undertakings Results

Gas Supply Company, Ltd.

In their report for the year to June 30 last, the Directors of the Gas Supply Company, Ltd., of Melbourne, state that the quantity of gas sold was 12% more than in the preceding year. New services laid numbered 516, and new appliances connected 2,402. The accounts for the year show a profit of £19,674, which compares with £17,715 a year ago. A dividend for the year of 5½%, transfer to Reserve Account of £500, and transfer to provision for income-tax of £1,650 will leave to be carried forward the sum of £536, which is a few pounds more than was brought in. Owing to the coal strike in the latter half of 1938, it was necessary to import some coal from England; but apart from this and the increased costs of wages, coal, and materials there have been no abnormal factors materially affecting the Company's operations during the year. Notice of a new issue of shares has been posted to the proprietors.

Keighley

The total quantity of gas delivered during the year to March 31 last by the Borough of Keighley Gas Department was 467,308,000 cu.ft. This is an increase of 22,271,000 cu.ft. over the quantity delivered in the previous year, when a decrease was reported amounting to 12,217,000 cu.ft. The total number of consumers at the end of March was 16,179, as against 15,988 a year ago. Ordinary consumers numbered 4,906, and 11,273 were provided with prepayment meters. The average consumption per ordinary meter was 33,438 cu.ft., and per prepayment meter 18,565 cu.ft. With the putting to work of the new vertical retort installation, the calorific value of the gas supplied to the Keighley area was reduced from 500 to 475 B.Th.U., and at the same time the method of charging was altered from the "step" to the "block" system, which removed anomalies in respect of consumptions on the border lines of the "blocks." During the year the number of street lamps lighted by gas increased from 1,634 to 1,844. At the end of the financial year, the total number of mantles in use was 4,006; while the number used during the year was 17,520—an average replacement of 4.31 mantles per nozzle per annum. During the year one gas-fired boiler for central heating was installed; and in one instance steam has been superseded by gas for boiling large quantities of caustic soda solution used in the manufacture of wool combing machinery. A large iron-works in the district has installed a gas-heated conveyor oven of the latest design for the drying of enamelled wringing machine frames. With the enlargement of the borough as from April last year, the Haworth gas undertaking was acquired by the Corporation. Financially, the result of the year's working is a net loss of £9,870.

Paisley

During the twelve months ended May 15, the quantity of gas made by the Town Council of Paisley Gas Department was 625,694,000 cu.ft., and the quantity sold and accounted for 601,415,000 cu.ft., which compares with 588,671,000 cu.ft. in the preceding year. The number of meters in use at the end of the period under review was 27,896, of which 17,072 were prepayment meters. The number of cooking stoves, range plates, and grillers in use was 27,277. Out of a gross revenue of £121,203, the balance carried to Net Revenue Account for the year is £22,551, but after payment of interest and other charges a deficit for the year is shown of £4,243.

Two Hundred Miles on Half a Pint of Petrol

A producer gas trailer on tow behind a London omnibus

A Gas Light and Coke Company lorry fitted with an improved type of gas producer accomplished a completely trouble-free run of 200 miles one day last week without refuelling and with a consumption of a half pint of petrol. The vehicle was one of a group inspected by Mr. Geoffrey Lloyd, the Secretary for Mines, at the London County Council Fire Brigade headquarters on November 9.

FOLLOWING his statement in the House on the developments in the use of alternative fuels for motor transport, Mr. Geoffrey Lloyd, the Secretary for Mines, met a party of technical and other journalists at the Mines Department offices on Nov. 9 and accompanied them in a double-decker London Transport 'bus propelled by gas generated in a trailer producer to the Fire Brigade headquarters on the Albert Embankment, where fifteen other vehicles fitted with gas producers were inspected. It was explained that the committee of scientists and road operators set up by the Government some time ago under the Chairmanship of Sir Harold Hartley, and representing the Department of Scientific and Industrial Research, the Ministry of Transport, the Mines Department, and several important road transport operating companies, was clearing the road for industrial and commercial development of alternative fuel transport under war conditions.

The road transport operators on the Committee conducted extensive running tests with different types of producer under commercial conditions, and the Committee thus secured a great deal of practical experience of the performance of producers, the difficulties of operation, and the problems of converting vehicles to run on producer gas. The Fuel Research Station carried out a large number of running tests with different types of producer and many different fuels over a standardized test route, and did bench tests on filtration problems. As the result of exhaustive work in the laboratory and under commercial conditions a gas producer has been designed which can be recommended for manufacture.

No Tax or Rationing

No tax is to be imposed on home produced coal, coke, or gas when used as a fuel for motor transport within the next five years, and in the case of services of national importance there is no intention to ration alternative fuels. Concessions are also to be made in cases where the weight of the auxiliary equipment, added to the unladen weight of vehicles, puts them into higher licence duty and lower speed limit categories.

The producer design approved by the Committee is based on the application of well-known principles to the conversion under war conditions to producers of existing motor vehicles using fuels available in this country. The design is to be made available to firms able and willing to undertake manufacture, and the Society of Motor Manufacturers and Traders are ready to assist with the necessary contacts as far as their members are concerned. In many cases the best method of conversion is considered to be to mount the equipment on a trailer, and a suitable trailer has been designed and tested for this purpose.

The problem of the availability of suitable fuels has been studied by the Fuel Research Station and its Coal Survey Staff, and a range of low volatile anthracite and certain types of low temperature coke have been specified as suitable. Research on carbonization is in progress, and if this is successful, it should be possible to widen considerably the range of fuels. Most of the producers on the Continent are operated on charcoal, which is available in this country only in small quantities. It is stressed that producer gas operators should be careful to specify the correct fuels, for the use of unsuitable material is likely to defeat the whole object of the conversion.

The sixteen vehicles inspected were fitted with producers of different types, though all working on the same principle. Some were designed for use on trailers, others on the front at the sides of the bonnet, on the roof, behind the driving seat, on the rear and below the front of the vehicle. The Gas Light and Coke Company lorry which had done 200 miles the previous day on a half pint of petrol and only the initial fuelling of the producer was pointed out with pride, and the driver, together with the driver of a sister vehicle parked alongside, was enthusiastic in his praise of the smooth running of the equipment.

Some General Questions

Sir Harold Hartley, Dr. F. S. Sinnatt, Director of Fuel Research, and representatives of the six road transport operating companies concerned in the development of the standard type producer, mingled with the visitors and answered innumerable questions on the use of the alternative fuels. It was made clear that although the Gas Light and Coke Company was operating producer gas vehicles it was none the less interested in the further development of transport by gas, both in bags and in compressed gas cylinders. Vehicles had, in fact, been successfully driven on producer gas generated from gas-works coke, though it was admitted that further work was necessary before this was likely to become general practice. Research is going on in at least three large gas undertakings, as well as at the Fuel Research Station, on the manufacture of coke suitable for use in the producers. At the same time the independent manufacturers of gas producers are expected to pursue investigations with a view to levelling up the capabilities of their producers in order that they may be able to deal with what may be termed an intermediate type of coke.

While the official design, details of which will not be broadcast, will be available to all bona fide manufacturers, there is no desire to discourage the activities of those manufacturers who have independently developed efficient producers for transport purposes; on the contrary, the official attitude will be to welcome every sound contribution that can be made to the solution of the alternative fuel problem.

Fuel Luncheon Club

Members of The Institution of Gas Engineers will be welcome at the next meeting of the Fuel Luncheon Club, at the Connaught Rooms, Great Queen Street, W.C.2, on Nov. 16, 1939, at 12.40 for 1.10 p.m., when the after-luncheon Address on "The Development of Modern Engines for Liquid and Gaseous Fuels" will be given by Mr. W. A. Tookey, M.Inst.C.E., M.I.Mec.E. The Chair will be taken by the President, Lt.-Colonel W. A. Bristow, M.I.E.E., F.R.A.S. The cost of the luncheon is 6s. per head (exclusive of gratuities and liquid refreshments). Anyone wishing to be present is asked to forward his remittance to the Secretary of the Club, when a ticket will be sent to him. This ticket must be given up at the luncheon, and no refunds can be allowed.

THREE YEARS AT PERTH

The following written contributions to Mr. A. C. Rea's Paper on the above subject before the North British Association of Gas Managers have been received, together with the Author's replies thereto.

Mr. H. A. Aitken (the President): Mr. Rea has stated that in requesting him to contribute to the Proceedings of our Association, I left the choice of subject to himself. I am glad he made the choice he did, and more pleased still with the clear and succinct account of practical work done and valuable data observed and compiled which he has placed at our disposal. In the three years during which Mr. Rea has been at Perth he has put in some highly commendable work in the distribution, sales, and manufacturing departments of his Undertaking, and we shall all be stimulated by the keen and progressive spirit thus displayed by one of our younger Engineers. Mr. Rea seems to have devoted his attention first to the improvement of his distribution system and to ensuring that everyone of his consumers is supplied with gas at adequate and constant pressure; surely there is no more important factor than this in the make-up of the satisfied consumer. Records and loggings of mains and services are of course, of increased importance in these days of War Risks.

Mr. Rea has instituted periodical testing of service meters, and it is my firm belief that he has been very wise in scrapping all two-light meters and replacing them by larger ones. Where these small meters exist I am convinced that leakage occurs. The sales and advertising campaign are conceived in the right spirit. It is impressed upon consumers, both by way of the Press and personal canvass, that they are receiving first-class service along with a first-class commodity. The success of his efforts is reflected in the increase in the sale of gas from 380 million cu.ft. in 1937 to 411 millions in 1939.

The description of the new carbonizing plant is of more than passing interest. The success of the new system of heating with the pressure producer and the use of warm primary air is shown by the very attractive reduction of the fuel consumption which has been brought down to as low as 10%. These details show that improvements in design, resulting from effective research, have been seconded by careful and intelligent control. Fuel economies are welcome in peace time, but in war time with advancing coal prices they are likely to be imperative. The Author shows, too, that benzole recovery is profitable to his Undertaking as well as serviceable to the Nation.

Mr. Rea's Paper is an instructive addition to our Association's Proceedings. His achievements during the past three years at Perth are worthy of the highest praise, and I take this opportunity as President of the Association, to express to Mr. Rea on behalf of the members and on my own behalf, our thanks for having given us such an interesting and instructive address brimful of points for useful and informative discussion.

Mr. Rea: I much appreciate the very kind comments on my Paper and references to the progress which I have been able to achieve at Perth. You would more than share in the general disappointment that the St. Andrews Meeting had to be cancelled and that all your arrangements for what would have been another enjoyable meeting were upset at the last minute. I can assure you that I much appreciated the honour of being asked to prepare a Paper and have derived much information in its preparation and subsequent written discussion.

The Benzole Balance Sheet

Mr. W. Nicol Baird (Dunfermline): I have read your Paper with very great interest, and I would like not only to congratulate you on the thoroughness with which you have tackled your problems there, but also for the frank manner in which you have put forward your decisions and the reasons why you have made them. This naturally leads to much discussion and criticism. I like the co-operation you have achieved with the Master Plumbers' Association. That seems to me to be a step in the right direction. In Dunfermline we do all our fitting in water as well as in gas because that has seemed the lesser of two evils, but the co-operation of all the plumbers would be a real asset if we could be sure that they would handle this work as well as we can ourselves. There is a definite lack of training and knowledge in this line, however, especially with the small business plumber.

My main object in writing to you is to disagree entirely with your benzole balance sheet. You have an increase in gas sales during the 1939 period the profit from which you appear to have credited entirely to benzole whereas, in fact, you are only entitled to add the 8,648,000 cu.ft. at your net cost of coals which appears to be in your case 7.778d. per 1,000 cu.ft., reckoned as follows:

Cost of Coals per ton		£1	2 3
Less Residuals—			
Coke, 8.5 cwt. at £1 per ton	= 8s. 6d.		
Tar, 17.75 gall. at 2d. per gall.	= 3s. 0d.		
S/A, 24 lbs. at 25s. per ton	= 3d.		
		11	9
		10	6

Gas made per ton = 16,079 cu.ft.
Hence the net cost per 1,000 cu.ft. = 7.778d.

Now 8,648,000 cu.ft. at 7.778d. per 1,000 = £280, which means that your credit of £1,081 is (£1,081 − £280) = £801 too much, or in other words you actually have a loss of £31 for that period instead of a profit of £770. In addition you still have the expense of processing and taking this extra gas from the retorts to the consumers' meters. If you do not feel convinced with this argument just imagine what the effect would be on your balance sheet if you registered a decrease in gas sales during the same period!

To make a true comparison, however, I have worked out another balance sheet *assuming* that there has been *no increase in gas sales*:

Thus the gas sold during the 1939 period is still 158,385,000 cu.ft. Make per ton = 16,079 cu.ft.; hence the coal carbonized = 9,850 tons; hence increase in coal carbonized = 9,850 − 8,734 = 1,116 tons.

Explanations:

$\frac{24,626}{10,388}$ = 2.37 gall. of benzole extracted per ton of coal.

$\frac{23,344}{24,626}$ = Gallons of benzole extracted, allowing for no *increase in sales of gas in* 1939 *period.* / Gallons of benzole actually extracted during 1939 period.

Additional Expenditure:

Extra coal, 1,116 tons at 22s. 3d.		£1,241	11 0
Gas oil, $\frac{1,270 \times 23,344}{24,626}$ = 1,203 gall. at 6d.		30	1 6
Boiler fuel, $\frac{200 \times 23,344}{24,626}$ = 189.5 tons at 20s.		189	10 0
Plant maintenance, 1,116 tons at 9d.		41	17 0
Water, $\frac{£10 \times 23,344}{24,626}$		9	9 6
Labour, $\frac{£37 \times 23,344}{24,626}$		35	1 6
		£1,547	10 6

Additional Income:

Benzole, $\frac{9,850 \times 24,626}{10,388}$ = 9,850 × 2.37 = 23,344.5 gall. at 8¾d.		£851	2 0
Coke, 1,116 tons at 8.5 cwt./ton = 474 tons 6 cwt. at 20s.... ...		474	6 0
Tar, 1,116 × 17.75 = 19,809 gall at 2d.		165	1 6
S/A, 1,116 × 24 lb. = 12 tons at 25s....		15	0 0
	£1,505	9	6
Less Increased Expenditure	1,547	10	6
NET LOSS during period of 4 months	£42	1	0

If we multiply this by 2.85 instead of 3 (since the months of January, February, and March are slightly higher in sales) we get your annual loss as being £120.

Of course, each year as your output rises your deficit becomes proportionately larger. Therefore, your actual loss during 1939 will be greater than £120. In addition to this I feel that your allowance for plant maintenance at 9d. per ton is on the low side, especially so in your case of very small retorts. You have forty units doing the same work as twenty in our case at Dunfermline, and I would therefore be inclined to put your figure at a minimum of 1s. which would add another £45 to your annual loss.

From a National point of view the Chancellor of the Exchequer has lost £2,217 computed at 8d. per gallon taxation. So if the whole country were taken into account the income tax might not have risen to 7s. 6d. in the £ if it were not for the benzole optimists! Similarly you have prevented over 3,000 tons of coal being exported this year so our National credit abroad is depleted by over £3,000.

There seems to be no end to the ramifications of this argument, so I will have to leave it at that just now, except to point out that I am afraid that your benzole plant far from paying off the £222 estimated annual cost of the dehydration plant has left you with

the capital cost of both plants plus the interest, to be found from the price of gas during the next 20 years.

Mr. Rea: In reply to your observation that there is a lack of knowledge among plumbers regarding water heaters, I agree, but in our co-operative scheme the plumber is only called upon to connect the cold water supply to the heater, previously positioned by the gasfitter. Final adjustments are made by the gasfitter on his second call. The arrangement is not ideal, but as the plumbers have been granted the right to do all plumbing work this amicable understanding has proved acceptable to all parties.

Profit Can Be Shown

To get down to the benzole business, I cannot be persuaded by any show on paper that I am losing money by extracting benzole. Even you admitted in your own Paper that at Dunfermline a profit of £541 could be shown under certain circumstances, so surely Perth can do likewise. But you go on to draw the conclusion that if coke fell 1s. per ton then benzole extraction would show a loss. Why blame the benzole plant for the drop in coke prices, and saddle it with all the loss, when the coke market is a law unto itself, influenced by man and nature and mostly irrespective of quantities available.

In your remarks you purport to show that the net cost of gas at Perth is 7.778d. per 1,000 cu.ft. You have taken my nominal minimum coke price of 20s. and forgotten that we *do* recover benzole. From our published accounts you will be able to calculate that the actual net cost per 1,000 cu.ft. of gas made in 1938-9 was 5.81d. I merely point this out in fairness to our manufacturing efficiency and not as at first may seem to substantiate your case in showing a greater loss.

The crux of your whole argument lies in your statement that "you still have the expense of processing and taking this extra gas from the retorts to the consumer's meter." I have to admit my first wrong assumption in my own balance—namely, that I took credit for receiving a revenue of 2s. 6d. per 1,000 cu.ft. for the additional gas sold; 2s. 6d. is the gross revenue and should have been net as for the other by-products. I have an empirical system for arriving at my revenue commodity charge in which the costs of manufacture plus certain proportions of overheads are added, and this for the year 1938-9 was approximately 1s. 9d. per 1,000 cu.ft. or 4.67d. per therm. The net revenue, therefore, for this extra gas should read 2s. 6d. less 1s. 9d. equals 9d., in place of 2s. 6d.

The second wrong assessment in my balance is the revenue per gallon received for benzole. The figure of 8¾d. is the net revenue. As you will have noticed, I have already included the working expenses against the benzole plant on the debit side. The gross revenue should therefore have been used—namely, 10.96d. per gallon.

Round Figures

In drawing up my first balance I used "round figures" for the various costs, as it appeared to me that a conservative estimate should be given to cover probable fluctuations, which in the by-product market are often erratic. However, to show the actual conditions prevailing at the times of comparison I have prepared a second balance using actual figures (as shown in my annual returns), which shows that there is still a substantial net profit being made. I have also prepared a further balance sheet assuming no increase in gas sales. This also shows a substantial profit.

I know that you have studied this benzole question very minutely, and would therefore like to go over some further points. My actual coal costs were 21s. 11.55d. per ton, so that I have allowed 3.45d. for handling. This cost varies according to coal put into or taken from stock. 1938-9 it was 2.75d. Gas oil actually cost 5.57d. per gallon delivered in 10-ton rail tank to gas-works. It is emptied by gravity at a cost of a few shillings. Two hundred tons of boiler fuel were estimated to be used for the six months to May 15. For the four months under review this would be 150 tons. The sum of 9d. per ton amply covers our 1938-9 plant maintenance figure. This again varies from year to year depending on work done. I think you would agree that a small ellipse is mechanically stronger than an elongated rectangle.

Water only costs the expenses of pumping, as river water is used throughout. Labour is merely a re-allocation on paper, so that there is no additional costs to the Undertaking.

Benzole I have dealt with, but I would add that since May 15 there has been a further rise of ¼d. per gallon in basic price, and when the new agreement comes into force, as I stated, I expect to receive another ¼d. to ½d. per gallon. You observe that the Exchequer is losing revenue on home produced fuel. From a highly patriotic angle this may weigh with some. Others even send donations to the Government, but in these days of subsidies I have no compunction in taking my share for the benefit of Perth consumers.

A Patriotic Duty

Further, there is a difference between benzole and motor fuel generally. The first contains recoverable toluole, the making available of which in these days must also be considered a patriotic duty. As for prevention of coal exports, the potential coal production is, unfortunately for the miners and export trade, far in excess of the demands. In contrast, I have given employment by using more coal. Compare our two Undertakings with nominally the same gas output; last year you carbonized 24,389 tons against my 27,337 tons, and with a full year's benzole extraction will be nearly 30,000 tons. In the last three years my increased coal used is over 4,000 tons with the same approximate staff and men, which must reflect in a cheaper gas therm.

Coke production is theoretically increased due to less steaming. An actual increase in the year's average of 0.3 cwt. per ton was recorded, but as other variables are likely to have greater results on the actual coke sold per ton—*e.g.*, coals, producer efficiency, steam used on works (as we use coke for boiler firing) —I have not taken credit for this increase in make. Actually my coke sales per ton of coal are down due to "Dri-Gas" plant steam requirements.

The gallons per ton of tar theoretically should fall, but comparing the years 1938 and 1939 there is an actual rise of nearly ½ gallon per ton. A total of 26.44 lb. of sulphate of ammonia were actually produced last year per ton of coal.

There are so many variables from year to year in production quantities and revenue for residuals that it is unwise to dogmatize on specific instances, and the accumulation of these are carried to the financial balance and adjusted in the price of gas, if necessary. This must be so with benzole, and up to now it is showing a definite credit.

I have enjoyed re-reading your Paper and the tussle in the Technical Press in which you formed the opposition, and personally feel that I have benefited by the closer study provided and for which I acknowledge my indebtedness to you. Like you, I am prepared to shift my stance, and in the present case it is to realize that my profit is not so much as at first apparent, but nevertheless sufficient to justify, on financial grounds alone, the installation of the benzole plant. The improvement in gas quality and sulphur reduction you will appreciate. I notice that your proportional costs of coal recovered from residuals has fallen this year from 74.10% to 67.01%. My corresponding figure has held steady (66.8% to 66.9%), and I attribute this largely to the extra revenue from benzole production and other residuals.

Benzole Production—(Amended Balance)

Balance for period January 15 to May 15, 1939, over same period in 1938.

Extra Actual Costs and Quantities.

Expenditure.		
Coal.—1,654 tons at 21s. 11.55d. + 2.75d. handling = 22s. 2.3d. ... ... =	£1,835	
Gas Oil.—1,270 gall. at 5.57d. per gall. ... ... =	30	
Boiler Fuel.—150 tons at 20s. per ton ... ... =	150	
Carbonizing Plant Maintenance.—1,654 tons at 9d. per ton ... ... =	62	
Water (estimated) ... ... =	10	
Labour (allocation of existing wages) ... ... =	37	
		£2,124
Revenue.		
Benzole.—24,626 gall. at 10.96d. per gall ... ... =	£1,124	
Coke.—1,654 tons × 8.01 cwt./ton = 662 tons at 23s. 8d. per ton (average net price recd.) ... ... =	783	
Tar.—1,654 × 17.75 gall./ton = 29,358 gall. at 2d. per gal. ... ... =	245	
S/Ammonia.—1,654 tons × 26.44 lb./ton = 20 tons at 25s. per ton ... ... =	25	
Gas.—8,648,000 cu.ft. at (2s. 6d. revenue, less 1s. 9d. commodity charges and on costs) = 9d. net ... =	324	
		2,501
Net Profit		£377

Proportion of gas made in above period to total in 1938/9 = 452/167 = 2.7.

Therefore Annual Profit = £377 × 2.7 ... ... =	£1,018	
Plus wage re-allocation = £37 × 3 ... ... =	111	
(Approximate Capital Cost = £3,000)	£1,129	Gross Profit to Undertaking.

Therefore Repayment of Capital in 2¾ years.

Benzole Balance Sheet

Assuming no increase in Gas Sales.

Thus the gas sold during the 1939 period is still 158,385,000 cu.ft. Make per ton = 16,079 cu.ft.; hence the coal carbonized = 9,850 tons.

Hence increase in coal carbonized = 9,850 − 8,734 = 1,116 tons.

Additional Expenditure.

Extra Coal, 1,116 tons at 22s. 2.3d.	£1,238
Gas Oil $\frac{1,270 \times 23,344}{24,626}$ = 1,203 gall. at 5.57d.	28
Boiler Fuel $\frac{150 \times 23,344}{24,626}$ = 142 tons at 20s.	142
Plant Maintenance = 1,116 tons at 9d.	42
Water	10
Labour	37
	£1,497

Additional Income.

Benzole $\frac{9,850 \times 24,626}{10,388}$ = 9,850 × 2.37 = 23,344.5 gall. at 10.96d. ...	£1,060
Coke, 1,116 tons at 8.5 cwt./ton = 474 tons 6 cwt. at 23s. 8d.	561
Tar, 1,116 tons × 17.75 = 19,809 gall. at 2d.	165
S/Ammonia, 1,116 × 26.44 lb. = 13 tons at 25s.	16
	£1,802
Less Increased Expenditure	1,497
	£305
£305 × 2.7 = Net Profit for Year	£823
Add. wages £37 × 3 (not additional)	111
Gross Profit to Undertaking	£934

Confirmation that Benzole Pays

Mr. J. W. Napier (Alloa): I was much interested to read your communication "Three Years at Perth" and desire to congratulate you on the way the subject matter has been portrayed. I should like to say now that your financial results confirm our own working, and our two cases should surely confute the arguments of others to the effect that benzole extraction does not pay. The disposal of the extra coke is only an imaginary ghost. On the subject of benzole production, I observe that you do not state the sp.gr. of the crude benzole, and I should be glad, if you are agreeable, to have this information. I should also like to know on what basis the oil circulation—*viz.*, 295 gallons per hour—has been determined.

Mr. Rea: For your information I may say that the gravity in the first month or so was in the region of 0.816. It has been climbing up since then, and recent deliveries have been from 0.821/0.823. I attribute the rise in gravity partly to the gas oil becoming more stable, and also to the fact that we are now producing a lower quality of benzole, which ranges from 65/70% at 120°C. As you will be aware, under the new assessment for the quality of benzole which comes into operation on January 1, 1940, there is no provision under the scale of payment for gravity of the "once run spirit" below 0.820. I have therefore been making every endeavour to get my gravity up.

In answer to your second point, regarding the rate of oil circulation, I have no standard method for determining this, but have drawn up a table which has been calculated from the maximum oil circulation at the normal capacity of the plant. It serves as a convenient method for giving instructions to the boilerman who has the supervision of the plant.

TABLES OF OIL CIRCULATION

Make of Gas. Thousand cu.ft. per hour.	Oil Circulation—Gallons per Hour. Table No. 1.	Table No. 2.	Table No. 3.
25/34	110	160	210
35/44	160	210	250
45/54	210	250	300
55/64	250	300	340
65/74	300	340	390
75/84	340	390	430
85/94	390	430	475
95/104	430	475	—
105/—	475	—	—

Based on—Capacity of Plant ... ... = 2,500,000 cu. ft. gas.
Maximum Oil Circulation ... ... = 475 gall. per hour.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION

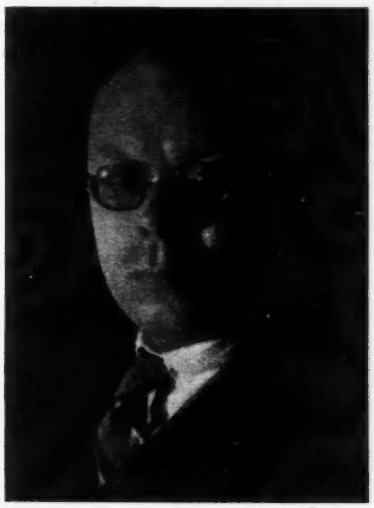
Presidential Address

of

F. O. HAWES

(of the Tottenham and District Gas Company)

The Address was delivered at a Meeting of the Association held in camera on Saturday, Oct. 28.



The President

It is my misfortune that I should be addressing you under somewhat unusual circumstances, but I am very glad to see so many here who are thus showing that they agree with the Council's policy of carrying on. We had, of course, no alternative but to cancel the programme arranged for the session. Works visits were impossible, the London School of Hygiene and Tropical Medicine informed us that no meetings would be held there, and from the Press we gathered that technical associations of every kind were closing down. In the circumstances there was a general feeling that perhaps we ought to follow suit; but a fighting speech from one member of the Council put forward another view, and he was so obviously right that his ideas were adopted.

He pointed out that if ever the interchange of experience and of technical information was of value, surely it was now when we might all be faced with conditions and emergencies of kinds outside our previous experience. Moreover, complete closure was a species of defeatism which did not appeal to him—and on consideration it did not appeal to the rest of the Council either. Therefore this meeting was resolved upon as an experiment to see how much support was forthcoming.

It must be clearly understood that these remarks are not intended as criticism of any organizations which have ceased their activities for the time being. The London Juniors are in a unique position. A sufficient number of our members to make meetings possible live in or close to London and many are engaged on large undertakings. The manager and chief technical staff of small works feel, of course, that they must stay on the spot; but so far as big undertakings are concerned most of the staff have some free time, and, therefore, we feel that the opportunity for meetings should be available.

Discussion Group Meetings

We intend at present to carry on more or less on the lines of the discussion group meetings. That is to say, in general

there will be no set paper. Perhaps the discussion will be opened by somebody appointed by the Council, but the idea is that views and experiences on the widest scale shall be ventilated to our mutual benefit.

You will understand, I am sure, that in existing circumstances the preparation of a Presidential Address was a matter of some difficulty. I had written during the summer a comparatively lengthy one, but on reading it through it seemed to relate so particularly to the arts of peace that in these times it might have been rather a damp squib. So I set about redrafting it, taking as my text the more obvious fallacies and difficulties of the Fuel and Lighting Order as it applied to the consumption of gas. The considerable modification of the Order last week again left me high and dry, and the present brief address is what is left of two magnificent orations!

I had taken as the theme of my earlier address the thesis that some so-called restrictive legislation had contributed in large measure to the technical advance of the Gas Industry. The necessity for complying economically with the various requirements of pressure, purity, candle power, and more recently calorific value had stimulated research and directed policies of design and management so that the present efficient state of the Industry was quite largely due to the very enactments which some call restrictive.

Conversely the acceptance by Government circles some years ago that the more or less complete removal of sulphur was impossible had slowed down research on that problem until it was only now that we are becoming sulphur conscious and really getting down to the problem of its elimination.

In justification of my view, let me tell you what the Gas Regulation Act has meant to the Tottenham Company. Our gas has been tested for calorific value by an Official Examiner since 1909. This testing was brought into line with the rest of the country by the passing of the Gas Regulation Act in 1920 and testings were ordered at the rate of four per week at two separate stations. In order to be sure of finishing the quarter above the declared value with these intermittent tests we felt it necessary to keep our value well up, and, in fact, our quarterly average for the first year or two after we had declared a value of 500 B.Th.U. per cu.ft., was in the neighbourhood of 504.5 B.Th.U. per cu.ft.

After a few years, by the powers conferred under the Gas Regulation Act, the Gas Referees prescribed that we should have a recording calorimeter at our main testing station. Soon this station was transferred to our largest works, and since then Recording Calorimeters have been installed at two more of our larger manufacturing stations. The result of having these continuous records available has been that we are able to work much more closely to the declared value, and, indeed, for many years now our quarterly average has been below 501 B.Th.U. per cu.ft.

Financial Result

If this is looked at from the financial point of view the result is rather startling. The excess of the average value over the declared value has been reduced by about 3.5 B.Th.U. per cu.ft. On an output of some 4,000 million cu.ft. per annum, this represents 140,000 therms, which at 8.6d. per therm (our price until lately) means a saving to the Company of some £5,000 per annum, which would have been given to the consumer had the old method of testing been maintained.

Mr. P. C. Gardiner, Chief Chemist of the Tottenham Company, read a Paper before the Eastern District of the Southern Association in February, 1929, in which he showed monthly outputs in cubic feet and in therms for the years 1921 and 1922, during which latter year we changed our declared value from 450 to 500 B.Th.U. per cu.ft. He demonstrated that whereas the thermal output showed a regular increase throughout 1922 over 1921, the volume output showed this only for the earlier part of the year before the calorific value change. This shows strikingly, I think, that contrary to a view sometimes expressed, consumers do use their gas by the therm and not by the cubic foot, and an increase in calorific value means a decrease in volume used.

It is clear, therefore, that a consumer who needs one therm will use 200 cu.ft. of 500 calorific value gas but will only use and be charged for 198 cu.ft. of 505 calorific value gas. The Company thus lose the revenue from the sale of 2 cu.ft., both quantities having cost the same to make. As shown above, with a change of only 3.5 B.Th.U. per cu.ft. on a large annual output, the monetary loss may be considerable.

You may ask the cost of effecting this closer working with its consequent saving of £5,000 per annum. The result is attained by the use of recording calorimeters on the various streams of gas from the different gas-making units, these recorders being of similar type to those used by the official examiners. Some of you may have seen our calorimeter room at Tottenham where five recorders are installed for works control. One full-time junior looks after these in addition to carrying out a certain amount of analytical work and maintenance work on other recording instruments. A senior man gives part of his time to general supervision of this work. He also maintains touch with the various gas examiners and sees that the equipment of the testing stations is up to requirements. Including running costs, repairs, depreciation, and salaries a generous estimate for the total cost is about £1,000 per annum, which can be set against the saving of £5,000.

A further good result of this close working has been that extreme regularity of operating has ensued. Records from both calorimeters and gravitometers on the delivered gas show only small variations. By statute we have, of course, to keep our gas free from sulphuretted hydrogen by the Gas Referees test. In actual fact, we aim at a paper clean in 30 min. on an apparatus more sensitive than that prescribed.

The measures we have taken to deliver gas at adequate pressure to our consumers have been described by Mr. H. C. Smith, our Chief Engineer, in Papers before the Southern Association and the Institution. The net result is that, in our endeavours to comply honestly with the requirements of the Gas Regulation Act, we have provided for our consumers a supply of gas of regular quality at adequate pressure, thus ensuring their goodwill: and at the same time, we have been able to improve the efficiency of our working.

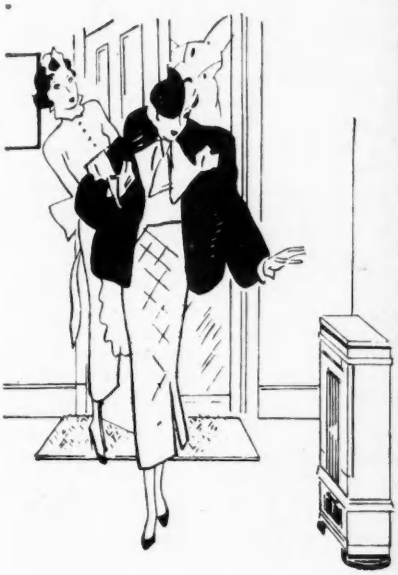
Combustion Characteristic

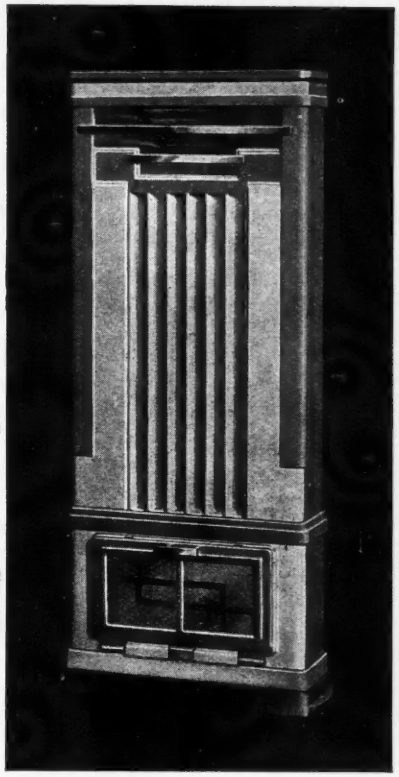
Another aspect of gas quality to which we have paid considerable attention is that of combustion characteristic. In fact, as you may remember, I first raised the matter before this Association some two or three years ago. The work then described has proceeded not only at Tottenham and Watson House, but in a wider field under the ægis of the Joint Research Committee of The Institution of Gas Engineers and the University of Leeds. So far as the consumer is concerned, the work has not yet gone far enough for much effect to be felt, but this brings me to a point at which the war impinges upon the subject of this address.

It may be that stress of conditions, difficulty with coal, necessity for benzole stripping, or even actual damage to plant will force upon some undertakings alterations of manufacturing methods or even reductions in declared value. Under these conditions the difficulties due to changes in combustion characteristics of the gas will undoubtedly manifest themselves. It is, therefore, very necessary that we should acquaint ourselves with what has so far been accomplished. The various reports of the Joint Research Committee, and in particular the Arthur Duckham Scholar's report by Dr. Haffner contain a lot of vital information. Dr. Haffner, working in Germany under Prof. Bunte, and using both Ott Burners and the Aeration Test Burner, has confirmed the conclusions previously reached at Tottenham regarding the effects of different dilution gases upon coal gas. He confirmed that the worst diluent from the point of view of lighting-back is carburetted water gas, then blue gas, producer gas, and waste gas in that order. He also showed something which we had not looked into at Tottenham, —that is, that the removal of benzole before diluting to a given calorific value is beneficial.

The work of the Joint Research Committee has been concerned solely with the Aeration Test Burner developed at Watson House, but I may remind you that all our pioneer work at Tottenham was carried out with a modified Ott Burner—that is, with a simple bunsen burner with a graduated air slide. Any who feel that they would like to watch the effects of manufacturing changes upon their gases, and who do not feel justified in spending much money on apparatus for the purpose can readily adapt a bunsen to their own purpose. I must emphasize that the information they obtain, although of the utmost value to themselves, will not be available to the Joint Research Committee for correlation with

The Ideal Gas Heater for





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TWO GREAT IMPROVEMENTS

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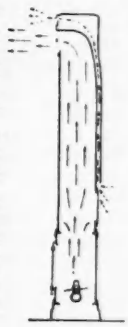

1. The large volume of pure air mixed with the heat stream issues horizontally from the Heater and so quickly warms the apartment.
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other work. Any who would like to join in a nation-wide collection of data must use the Aeration Test Burner. However, the chief danger to be feared is lighting-back, and a burner of the Ott type on which a reading of the air slide is taken at the point of incipient lighting-back is a reliable guide as to what is to be expected. If experiments can be carried out to find the scale numbers at which typical appliances light back then if the gas can be kept above this number no trouble need be feared on the district. Conversely, if it is known that changes in manufacture will cause the scale number to fall below this figure, then appliances may be adjusted beforehand. However, it is possible that by the application of the principle of dilution suggested above, drops of 25 B.Th.U. or so in the declared value might be tolerated on the majority of appliances.

Most undertakings are alive to the matters I have so far discussed, and there is no doubt that the attention now given to constant calorific value, constant gravity, and reasonably steady combustion character has made possible the use of the somewhat complicated appliances recently developed. The improved efficiency of these modern appliances is responsible for a falling off in the curve of increased outputs, and the net increase in therms sold per annum of some 30% to 40% over the past 15 years represents a much higher percentage than this in terms of service.

Progress in the Industry.

This year is the centenary of the death of William Murdoch, and the Gas Industry has been in being for some 130 years. Out of that long period I myself have spent only some 22 years in the Industry, but I find it rather thrilling to look back upon the progress that has been made in that short time. So many things which are now the familiar adjuncts of our daily work have been evolved or developed during the last 20 years.

On the manufacturing side we have intermittent chamber ovens, gas drying, Connersville meters, and exhausters, automatic water gas sets, and the waterless holder; recording calorimeters, oxygen recorders, Widlake pressure indicators and recorders are among a host of other recording instruments to assist in control. The development of the domestic coke market and the wholesale adoption of benzole recovery all come within the period under review, as also does an awakening to the necessity of reducing the sulphur evil.

On the supply side there are the enormous improvements in cookers such as packed ovens with thermostatic control and automatic lighting for the hot-plates, together with the all-enamel finish and now, the modern designs. Fires, too, have suffered a new birth in modern design and colour, efficient ventilation, elimination of noise, switch lighting and special radiants to give radiation of particular wave lengths. In this connexion one might mention also the clinical gas lamp. The gas refrigerator has also come within our horizon and with it, together with the improved modern water heaters, a new conception of publicity and salesmanship. The industrial field, too, has broadened enormously, and it is on these sides of our Industry that many of the opportunities of the future will be found. I feel that more and more the future of gas is bound up in its selling and service organization. We on the manufacturing side can make all the gas that can be sold; we may even be able some time to make it a little cheaper, but in my view actual cost has little to do with the amount of gas used. Of course, a drastic change in price either up or down would affect sales to a marked extent, but the limit in manufacture cost has probably nearly been reached. Perhaps a reduction of ¾d. per therm may eventually be achieved, but I feel that a reduction of ½d. per therm to the consumer is insignificant so far as his consumption is concerned. Bold tariffs, service, handsome and efficient appliances, these are the keystones to increased sales and the supervision of the selling, installation and servicing of appliances is going to offer some of the plums of the Gas Industry in the future. I can foresee the time when the Chief Executive of an undertaking will no longer be mainly an Engineer, but will have to be first and foremost a business man with a sound knowledge of trading and commerce. In fact, it is almost so now, and we on the technical side are gradually taking our places as the providers of munitions for the people in the firing line.

The Future

If I may continue for a while to wear the mantle of prophecy, I should like to hazard some suggestions about the possibilities of the future. First as to the gas-making process itself. You will all be familiar with the work which is in progress at Leeds on complete gasification under pressure. The implications of the work are tremendous. In the first place some slight reduction may be expected in cost per therm of gas. Secondly, it will probably prove possible to carbonize at will to produce a preponderance either of gas or of fuel oils. Thirdly, and most important to my mind, it seems that under the necessary conditions of temperature and pressure, nearly all coals react with equal facility. In other words, the Gas Industry may no longer be dependent upon supplies of gas coals but will be able to use any coal which is available.

These are the possibilities. They are by no means proved so far, and, in fact, the work is one barely out of the small scale laboratory stage.

One thing, however, is apparent, and that is, for commercial success, the units employed will have to be very large, certainly not less than about 10 million cu.ft. of gas per day. Therefore, if this new system gradually ousts the present methods of carbonization, it must do so by the gradual suppression of smaller gas-making units. This, of course, means an enormous increase in amalgamations; or, looking farther ahead, one can envisage the possibility of enormous gas grids covering large areas of country. Under such a scheme, gasification would take place at the pit head. The gas, made and purified at a pressure of some fifty atmospheres, would be distributed through the grid into the mains of the various undertakings, which could thereby retain their individuality and become primarily distributive organizations, as, indeed, has been the lot of most electrical undertakings. This is, of course, pure speculation on my part, but I do feel that the carbonization industry is a great national asset and should be to some extent nationally operated and controlled. The idea of Government control is repugnant to many, but a properly constituted Central Gas Board consulting with the Industry could do much to help us.

Finally, still in the vein of speculation, I hope one day to see established a Ministry of Fuel which will be in a position to direct the utilization of the country's fuel resources to the most economical and efficient ends. Such a Ministry would certainly abolish the consumption of coal in ordinary domestic appliances for smoke prevention would be one of its necessary duties. It is perhaps not too much to hope that guidance, if not definite instructions, might be given to the public as to which fuel is appropriate for given purposes and thus stupid competition at uneconomic rates be removed from the sphere of fuel selling. The proposed Ministry could see to it that the monopolies thus created did not adversely affect the consumer. The various Gas Acts provide a lead as to how this might be achieved, if their provisions were applied to the fuel trades in general.

Unaccounted-For Gas

Wales and Monmouthshire Association Discussion

Mr. C. B. Felton replies to the discussion on his Paper (published in the "JOURNAL" for September 27) at a meeting of the Wales and Monmouthshire Association of Gas Engineers on October 26—see last week's "JOURNAL."

I readily agree, writes Mr. Felton, that excellent work is done by the Pipes Committee under their very able Chairman, Mr. Escreet. Cardiff, like many of the old established companies, frequently come across evidence of the splendid material used in the earlier days of main laying. The fact that the unaccounted-for gas has been below 4% for such a period obviously places this Company among those able to afford the necessary supervision. Iwould not, however, allow that even the very small proportion due to leaky joints is negligible. Very valuable information can be compiled by records, and before laying any main the nature of the ground must be considered. The practice of examining pipes uncovered by other authorities is a sound one. In spite of the excellence of the

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earlier materials used, I feel confident that the present-day spun pipes and mechanical joints can be relied upon to give equally good service.

How very important the weak link in the chain can be, is seldom realized, and it behoves all undertakings to examine work from this point of view. With regard to meters and quality of gas under war-time conditions, it is hoped that the advance of knowledge in this direction will help to avoid any recurrence of the troubles of the last war-time period. Mr. H. Butterworth, of Manchester, has explained in his remarks the difficulties encountered in this direction, and I would suggest that if the usual skins for meters are again unobtainable, the research department should devise some special treatment of the substitute to overcome the difficulty.

I would hasten to assure Mr. W. H. Johns that he need have no fear of the mechanical joint. The small percentage of those which failed to pass severe test was mostly due to poor manipulation by inexperienced jointers or, in isolated cases, to some slight defect in casting. It was not due to any defect in the joint, that the tester was used, but merely to introduce a more positive method of testing. It is agreed, I think universally, that in some instances steel mains are essential; and I agree that the joints should have as long a sleeve as possible.

In reply to Mr. J. F. Rust, it is pleasing to hear that the test applied to the main was so satisfactory, though I would suggest that perhaps vibration helped in some way to account for the chart-marking to which he refers.

I would like to thank Colonel Carr for his valuable support and for his remarks in connexion with the extensions carried out recently in Yorkshire, which were obviously a well planned scheme. I entirely agree with his remarks in connexion with welded steel mains and the necessity of expert welders being employed. The movement test under pressure has proved most valuable and will instil the much-desired confidence in modern methods.

I would like to say how much I appreciate the interest Mr. George Dixon has taken in the Paper. My reference to the Committee investigating the different causes of my subject was to excuse myself from producing a vast amount of detail, which I felt would defeat my object of a small Paper and would have aroused many questions which I fear my experience would have been too limited to answer with satisfaction.

Control of Gas Lighting

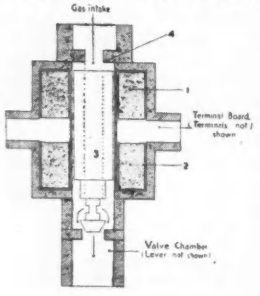
Possibilities of the Webson Gas Switch

We publish the following notes in reponse to requests for information on gas lighting control equipment. This is the second description of available equipment, the first being given in last week's "JOURNAL."

THE Webson system is applicable to central control of premises with gas lighting, and while the switches were first introduced for domestic use on single or dual control, many gas engineers have proved the usefulness of the system in instantaneous control of larger premises—for example, public halls, factories, churches, &c.

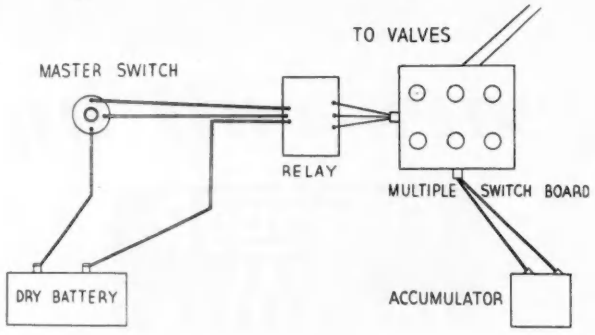
The system of operation is contact between the valve and control. When the white button on the switch is pressed, contact is made and the current flows through coil 1. The armature 3 being of hardened steel permanently magnetized will, by the additional magnetism produced by the current passing through coil 1, be lifted from its seating up to casing 4, thus opening the gas-way, and will be held in that position owing to the residual magnetism. When the black button is pressed the current flows through coil 2, the armature being drawn down to its seating and the gas-way closed.

The filament is connected in series with coil 1. Therefore should any defect occur in the filament or its connexions, the circuit to coil 1 will be broken and no current will pass through the coil, consequently the valve cannot be opened by the switch. As, however, the closing of the valve is be available to close the valve can still be closed though the filament circuit may be broken. An emergency device is provided in the valve seating chamber adapted to engage the underside of the valve and by moving the lever up the valve is lifted from its seating, when the gas can be ignited by a match or taper.



The coils 1 and 2 are so wound that as the battery falls off in strength sufficient current should be available to close the valve after the current has fallen below the strength necessary to open the valve.

For the installation of central control, the cable is brought back from each valve to a multiple panel switchboard. Consideration of distances comes into question in order to provide suitable gauge cable to overcome the resistance drop in current from switch control to filament, and no difficulty is experienced in controlling over long distances, by using the correct cable. The "Webson" standard valve is capable of controlling the supply of gas up to, and including a six-light No. 2 burner, thus coming within the range of a normal indoor lamp, and with the additional advantage of eliminating continuous by-pass consumption. In the case of central control of public lighting by gas, the lights can be operated from any one or more control points in the building.



Master Switch Control

A number of lights may be controlled from a master switch. Using a 3-wire relay, all lights can be extinguished instantly from the master switch and switched on again, independently of the switchboard. When fixing, the relay must be close to the switchboard, but the master switch and dry battery may be fixed at any desired distance.

The diagram shows this method of master switch control. With this installation the lighting points may be operated singly from the respective controls or simultaneously from the master switch.

Finally, the standard "Webson" valve works in conjunction with a catalytic filament, but in premises where there is excessive vibration so as to cause the filament to alter from its correct position in the gas-flow, a specially designed flashing by-pass can be fitted. This is also suited to controlling overhead radiant heat units, which may be operated either singly or collectively.

All sets and parts are manufactured by Webson (Manchester) Ltd., of Didsbury, Manchester, and distributed by Bowden Bros. and Co. (M/c.) Ltd., 85, Higher Temple Street, Manchester, 13, to whom all enquiries should be addressed.

Markets and Manufactures

Current Sales of Gas Products

The London Market

Nov. 13.

Present prices of tar products in the London market are as follows :

Pitch 30s. to 32s. per ton f.o.b.
Creosote about 5d. per gallon.
Refined tar 3¼d. to 4d.
Pure toluole is nominal at 2s. 6d. to 2s. 7d.
Pure benzole about 1s. 9d.
95/160 solvent naphtha about 1s. 10d.
90/160 pyridine 14s. to 14s. 6d.
All per gallon naked.
Refined naphthalene crystals about £15 per ton in bags.
All *ex* makers' works.

The Provinces

Nov. 13.

Crude Gas-Works Tar, 10s. to 15s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were : Pitch—East Coast, 25s. to 27s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 25s. to 27s.* Toluole, naked, North, 1s. 10d. to 1s. 11d. Coal tar, crude naphtha, in bulk, North 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4¾d. to 1s. 5d. Heavy naphtha, North, 1s. 2¼d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅞d. to 4¼d.; low gravity, 4d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4¼d. to 4¾d. per minimum 40% purely nominal, "B" quality unsaleable. Heavy oil : Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5¾d.; heavy tar oil, gr. less than 1,080 4½d. to 4¾d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls, whatever they may be.

Scotland

GLASGOW, Nov. 11.

A fair throughput is being maintained in most products although pitch and road tar are a source of worry to the tar distiller. Prices generally continue firm.

Crude gas-works tar.—Actual value is round 30s. to 32s. per ton *ex* works in bulk.

Pitch of vertical quality is unchanged with plentiful supplies available at 23s. to 24s. per ton, f.o.b. for export, and round 20s. to 22s. 6d. per ton *ex* works in bulk for home trade.

Refined tar is difficult to move in the home market with price at 3¾d. to 4d. per gallon, while for export supplies can be secured at 2¾d. to 3d. per gallon, both filled into buyers' packages at makers' works.

Creosote oil.—Production is well looked after with values as under : Specification oil, 4¼d. to 4½d. per gallon ; low gravity, 5d. to 5¼d. per gallon ; neutral oil, 4¾d. to 5d. per gallon ; all *ex* works in bulk.

Cresylic acid.—Prompt supplies are not easily secured and prices are maintained as under : Pale, 97/99%, 2s. to 2s. 3d. per gallon ; dark, 97/99%, 1s. 10d. to 2s. per gallon ; pale, 99/100%, 2s. 6d. to 2s. 9d. per gallon ; all *ex* works in buyers' packages.

Crude naphtha is not too plentiful with price at 6d. to 6½d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 6½d. to 1s. 7½d. per gallon and 90/190 heavy naphtha is 1s. 3d. to 1s. 4d. per gallon.

Motor benzole is 1s. 5d. to 1s. 6d. per gallon.

Pyridine.—Prices are purely nominal at 12s. to 13s. per gallon for 90/160 grade and 14s. to 15s. per gallon for 90/140 grade.

Peterborough Stock Issue

On behalf of the Directors of the Peterborough Gas Company, Messrs. Fox & Vergette are to offer for sale by auction at the Angel Hotel, Peterborough, on Saturday, Nov. 18 (at 3 p.m.), such an amount of consolidated ordinary stock of the Company as will, with the premiums resulting thereon, amount to the sum of £17,025 6s. 11d. This stock will rank for a standard dividend of 7%, subject to the sliding scale equally with the existing ordinary capital which has received 7½% per annum for the last eleven years. Further particulars may be obtained from the Secretary of the Company.

Contracts Advertised

Resheeting Gas Holder.
Rawmarsh Gas Department. [p. 358.]

Benzole Plant.
Burton-upon-Trent Gas Department. [p. 358.]

Concentrated Ammoniacal Liquor Plant.
Burton-upon-Trent Gas Department. [p. 358.]

Purchase of Surplus Crude Tar.
Burton-upon-Trent Gas Department. [p. 358.]

B.S/A.R.P.2
BITUMINOUS PAINT FOR STEELWORK

METROTECT

a bituminous paint conforming to the above specification, and producing a pleasant satin black finish with highly waterproof and anti-corrosive properties.

Protects steel-work which is continuously immersed in water. Does not "crocodile" on prolonged atmospheric exposure. METROTECT flows freely under the brush and can be applied quickly and without effort even in cold weather.

ALSO AN EXCELLENT BLACK-OUT PAINT FOR WINDOWS AND SKY-LIGHTS.

Prices and further particulars from—

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REGIS HOUSE,
KING WILLIAM STREET,
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Telephone : AVENUE 2755.

WEST'S service to the Gas Industry will continue...

At the present stage of the national emergency we are in a position to form some idea of the conditions under which engineering production for the Gas Industry will have to be carried on in the immediate future

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WEST VERTICAL CARBONIZING CHAMBERS

COAL AND COKE PLANTS

With a number of Contracts in progress and with many orders on our books for resetting and maintenance parts, we find we are able to carry on with existing Contracts, and to meet all requirements for the normal repairs and maintenance of existing installations

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FOR EVERY SIZE OF WORKS AND EVERY CLASS OF COAL...

WEST'S CARBONIZING PLANTS

GAS STOCKS AND SHARES

The heavier buying movement which set in on the Stock Exchange during the previous week came to an end on Wednesday last on the latest rumours of German threats to Holland. Prices reacted, especially among gilt-edged stocks, and home rails weakened on week-end selling. Most of the leading industrials were dull at the close, while Amsterdam selling of oil and diamond issues weakened the prices of these shares.

The volume of business in the Gas Market continued small and showed little change over that of the previous week. Prices were irregular and although a few preference stocks closed from 3 to 5 points higher, the majority of price changes were in a downward direction. Gas Light units, South Metropolitan, Tottenham, and Wandsworth ordinaries reacted slightly on the increased price of gas announcement, although Commercial and South Suburban closed unchanged. The heaviest falls occurred among those issues which had not previously been fully marked down to the lower levels—*e.g.*, Portsmouth 5% maximum, East Surrey 5% debenture and Mid-Southern 4% debenture, and there are still a few others to be similarly dealt with when inquiries for them are made. It is to be noted that in general the yields on the fixed-interest stocks now range between 5 and 5¼%. No changes of importance occurred either at the Provincial Exchanges or in the Supplementary List.

With holders reluctant to sell unless compelled to do so the market at present is practically confined to these sales for anything coming in so that very little stock is available. The following few parcels have been notified, however, and may be of interest:

Amount Offered. £		Dividend Basis. %	Price.	Yield. £ s. d.
	ORDINARY STOCKS.			
1,500	Commercial	4	54	7 10 0
500	Gas Consolidation "B"	6	20/-	6 0 0
220	Mid Southern Utility "C"... ...	5	83	6 0 6
500	Severn Valley £1	5½	18/6	5 18 9
500	Sheffield	6½	125	5 4 0
500	South Eastern £1	6	17/-	7 1 3
2,000	South Western Gas & Water £1 ...	5	16/-	6 5 0
1,000	United Kingdom Gas £1	5	15/6	6 9 0
700	Wandsworth	6½	99	6 11 0
	PREFERENCE STOCKS.			
450	South Suburban 4%		80	5 0 0
300	" 5%		100	5 0 0
500	Tottenham " 5½%		105	5 4 9

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week.
1,767,439	Sept. 4	8	8	Alliance & Dublin Ord. ...	110—120	...
374,000	June 19	4	4	Do. 4 p.c. Deb. ...	80—90	...
877,576	Nov. 6	5	5	Ascd. Gas & Water U'd'ts Ord.	14/6—16/6*	—/6
500,000	"	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/6—19/6*	...
535,545	"	4	4	Do. 4 p.c. Red. Cum. Pref.	16/—18/—*	...
318,730	"	4	4	Do. 4 p.c. Irred. Cum. Pref.	15/—17/—*	...
750,000	Sept. 18	3½	3½	Do. 3½ p.c. Red. Deb. ...	80—85	−2½
560,070	Aug. 21	7	7	Barnet Ord. 7 p.c.	110—120	−5
300,000	Oct. 9	1/9⅜	1/4⅜	Bombay, Ltd.	18/—20/—	...
181,185	Aug. 21	9½	9½	Bournemouth Sliding Scale ...	130—150	...
690,526	"	7	7	Do. 7 p.c. max. ...	110—130	...
493,960	"	6	6	Do. 6 p.c. Pref. ...	110—120	...
50,000	June 5	3	3	Do. 3 p.c. Deb. ...	70—75	...
362,025	"	4	4	Do. 4 p.c. Deb. ...	93—98	...
335,000	"	5	5	Do. 5 p.c. Deb. ...	110—115	...
357,900	Aug. 21	7½	7½	Brighton, &c., 6 p.c. Con. ...	107—117	...
659,955	"	6¾	6¾	Do. 5 p.c. Con. ...	100—105	...
205,500	"	6	6	Do. 6 p.c. 'B' Pref. ...	95—105	...
855,000	Sept. 18	8	7	British Ord.	90—100	...
100,000	June 19	7	7	Do. 7 p.c. Pref.	136—141	...
350,000	"	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
450,000	"	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	"	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
100,000	22 May '33	6	4	Cape Town, Ltd.	¼—¾	...
100,000	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref.	¼—¾	...
150,000	June 19	4½	4½	Do. 4½ p.c. Deb.	58—68	...
626,860	July 17	6	6	Cardiff Con. Ord.	95—105	...
237,860	June 5	5	5	Do. 5 p.c. Red. Deb. ...	97—102	...
98,936	Oct. 9	2/—	2/—	Colombo Ord.	1 7/16—1 9/16	−1/16
24,510	"	1/4⅛	1/4⅛	Do. 7 p.c. Pref.	20/6—22/6	...
739,453	Sept. 27	−/11.48	−/11.48	Colonial Gas Assn. Ltd. Ord. ...	15/—17/—	—/6
296,144	"	1/3.30	1/3.30	Do. 8 p.c. Pref.	20/6—22/6	...
1,775,005	July 31	4	4	Commercial Ord.	50—60	...
140,000	Aug. 21	4	4	Do. 4 p.c. Red. Pref. ...	88—93	−2
620,000	June 5	3	3	Do. 3 p.c. Deb.	55—60	...
286,344	Aug. 21	5	5	Do. 5 p.c. Deb.	85—95	...
200,000	"	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	94— 99	...
807,560	July 31	7	7	Croydon sliding scale	100—110	...
644,590	"	5	5	Do. max. div.	80—85	...
620,385	June 19	5	5	Do. 5 p.c. Deb.	90—100	...
208,660	Aug. 21	5	5	Dudley, Brierley Hill & Dist. Ord.	100—105	...
82,275	"	5	5	Do. 5 p.c. Con. Pref. ...	92—102	...
79,000	"	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	94—99	...
239,000	July 31	5	5	East Hull Ord. 5 p.c.	86—91	...
187,215	Aug. 21	6	5¾	East Surrey Ord. 5 p.c. ...	98—103	...
176,211	June 5	5	5	Do. 5 p.c. Deb. ...	90—100	−12½
250,000	July 3	4	8	Gas Consolidation Ord. 'B' ...	18/6—20/6	...
250,000	May 22	4	4	Do. 4 p.c. Red. Cum. Pref.	18/—20/—	...
9,172,463	July 31	5¾	5¾	Gas Light & Coke Ord. ...	15/6—17/6a	−1/6
2,600,000	"	3½	3½	Do. 3½ p.c. max.	57—62	−1
4,477,106	"	4	4	Do. 4 p.c. Con. Pref. ...	75—80	...
2,993,000	July 3	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	80—85	...
8,602,497	May 22	3	3	Do. 3 p.c. Con. Deb. ...	60—65	...
3,642,770	"	5	5	Do. 5 p.c. Red. Deb. ...	97—102	...
3,500,000	"	4½	4½	Do. 4½ p.c. Red. Deb. ...	95—100	+2
700,000	Sept. 4	3½	3½	Do. 3½ p.c. Red. Ded. ...	85—90	...
270,466	July 31	6	6	Harrogate New Cons.	95—100	...
157,500	Mar. 20	‡1/—	‡1/—	Hong Kong and China Ord. ...	¼—¾	...
5,600,000	Oct. 23	12	4	Imperial Continental Cap. ...	78—88	−2
172,810	July 31	3½	3½	Do. 3½ p.c. Red. Deb. ...	85—95	...
63,480	June 19	3	3	Maidstone 3 p.c. Deb.	57—62	...
45,000	May 22	†10	†10	Malta & Mediterranean ...	95—105	...
				Metropolitan (of Melbourne) ...		
392,000	Oct. 2	5½	5½	5½ p.c. Red. Deb.	95—100	...
231,977	Aug. 21	5	5	M.S. Utility 'C' Cons.	75—85	...
968,658	"	4	4	Do. 4 p.c. Cons. Pref. ...	70—80	−1½
390,076	June 19	4	4	Do. 4 p.c. Deb. ...	70—80	−15½
200,000	June 19	5	5	M.S. Utility 5 p.c. Deb. ...	90—100	...
125,000	July 3	3½	3½	Do. 3½ p.c. Red. Bds. ...	92—95	...
675,000	Nov. 6	†3	†4	Montevideo, Ltd.	50—60*	−2
250,000	Aug. 21	7½	7½	North Middlesex 6 p.c. Con. ...	105—115	...
396,160	July 31	5	5	Northampton 5 p.c. max. ...	101—106	...
300,000	Nov. 6	†7	9	Oriental, Ltd.	118—128*	−2
468,537	June 5	7	8	Plymouth & Stonehouse 5 p.c.	105—115	...
621,667	July 31	8½	8½	Portsmouth & Gosport Cons.	110—120	...
241,446	"	5	5	Do. 5 p.c. max.	78—83	−17
73,350	"	5	5	Do. 5 p.c. Pref.	80—90	...
75,000	"	4	4	Do. 4 p.c. Pref.	70—80	−4½
114,000	July 31	5	5	Preston 5 p.c. Pref. ...	90—100	...
247,966	June 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	95—100	...
625,959	July 17	4	4	Do. 4 p.c. Red. Deb. ...	93—98	...
15,000	Sept. 4	6	6	San Paulo 6 p.c. Cum. Pref. ...	7½—8½	...
441,275	Oct. 9	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	16/—19/—	...
460,810	Oct. 2	−/10½	−/10½	" " 4½ p.c. Cum. Pref. ...	16/—18/—	...
133,201	Aug. 21	5	8½	Shrewsbury 5 p.c. Ord. ...	107—117	...
9,000	June 5	†4	†4	South African Ord.	4—5	...
1,996,297	Aug. 21	1/2⅜	1/2⅜	South East'n Gas Cn. Ld. Ord.	15/6—17/6	...
1,000,000	"	−/10½	−/10½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/—	...
769,191	"	4	4	Do. 4 p.c. Cum. Pref. ...	14/6—16/6	—/6
450,000	"	4	4	Do. 4 p.c. Deb.	95—100	...
150,000	"	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
6,709,895	July 31	6	5	South Met. Ord.	62—72	−3
1,135,812	"	6	6	Do. 6 p.c. Irred. Pref. ...	95—100	+2½
850,000	"	4	4	Do. 4 p.c. Irred. Pref. ...	70—80	...
1,895,445	June 19	3	3	Do. 3 p.c. Deb.	60—65	...
1,000,000	July 17	5	5	Do. 5 p.c. Red. Deb. ...	97—102	...
600,000	"	3¼	3¼	Do. 3¼ p.c. Red. Deb. ...	92—97	...
1,543,795	July 31	6	6	South Suburban Ord. 5 p.c. ...	80—90	...
512,925	"	5	5	Do. 5 p.c. Pref.	87—97	+5
500,000	"	4	4	Do. 4 p.c. Pref.	70—80	−5
250,000	"	3¼	3¼	Do. 3¼ p.c. Red. Pref. ...	85—90	−4
888,587	June 5	5	5	Do. 5 p.c. Deb.	90—100	...
250,000	"	4	4	Do. 4 p.c. Deb.	75—85	−11½
200,000	July 31	3	3½	Do. 3½ p.c. Red. Deb. ...	85—90	−4
427,859	Sept. 18	1/2⅜	9⅜	S. Western Gas & Water Ord.	14/—16/—	...
160,523	Oct. 9	−/10½	−/10½	Do. 4½ p.c. Red. Cum. Pref.	17/6—19/6	...
110,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
750,541	July 31	5½	5	Southampton Ord. 5 p.c. ...	75—85	...
148,836	June 5	4	4	Do. 4 p.c. Deb.	75—85	−5
350,000	July 31	5½	5½	Swansea 5½ p.c. Red. Pref. ...	90—100	...
200,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—100	...
1,076,490	July 31	6½	6½	Tottenham and District Ord....	85—95	−5
409,835	"	5½	5½	Do. 5½ p.c. Pref.	95—105	−5
62,235	"	5	5	Do. 5 p.c. Pref.	85—95	+2
453,380	June 19	4	4	Do. 4 p.c. Deb.	75—85	−9½
85,701	June 5	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100	...
1,247,505	Oct. 23	6	4	U. Kingdom Gas Cor. Ord. ...	13/—16/—	...
1,085,952	May 8	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	14/—17/—	...
772,709	"	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	15/—18/—	...
745,263	June 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	13/6—15/6	...
1,093,656	Sept 18	3½	3½	Do. 3½ p.c. Red. Deb. ...	85—95	...
378,106	Mar. 6	7	7	Uxbridge, &c., 5 p.c.	90—100	...
133,010	"	5	5	Do. 5 p.c. Pref.	95—105	...
1,371,138	July 31	7	6½	Wandsworth Consolidated ...	85—95	−5
2,525,768	"	4	4	Do. 4 p.c. Pref.	70—80	+5
1,343,964	June 19	5	5	Do. 5 p.c. Deb.	90—100	...
383,745	"	4	4	Do. 4 p.c. Deb.	75—85	...
400,000	"	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	92—97	...
558,342	July 31	6½	6½	Watford and St. Albans Ord. ...	90—100	...
200,000	"	5	5	Do. 5 p.c. Pref.	80—90	...
200,000	"	5½	5½	Do. 5½ p.c. Pref.	90—100	−10
200,000	"	4	4	Do. 4 p.c. Rd. Pf. (1973/8)	85—90	−5
100,000	—	—	—	Do. 4 p.c. Red. Pf. (1959)	95—100	−2
200,000	June 19	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
200,000	"	3½	3½	Do. 3½ p.c. Red. Deb. ...	83—88	...

a.—The quotation is per £1 of Stock. * Ex. Div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Contd.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Nov. 10.	Rise or Fall on Week.
202,152	Sept. 4	5	5	Ascot Ord.	95—100	...
128,182	July 3	5	5	Do. 5 p.c. Pref.	101—106	...
31,035	Aug. 21	–/4⅛	–/4⅛	Associated Utilities 4 p.c. Pref.	15/—17/–	..
100,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
17,000	Aug. 21	8	8	Bognor Orig. Ord. 'A' ...	137—147	...
62,210	,,	8	8	Do. New Add. 'A' ...	105—115	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	100—110	...
37,440	July 31	10	10	Cam. Univ. & Town 10 p.c. max.	110—120	...
125,970	,,	7	7	Do. 7 p.c. max.	90—100	...
39,025	,,	5	5	Do. 5 p.c. max.	80—90	...
96,410	July 17	4½	4½	Cardiff 4½ p.c. Pref.	92—97	...
55,520	July 31	6	6	Colchester 6 p.c. Pref.	113—118	...
90,550	Sept. 18	5	5	Do. 5 p.c. Deb.	100—105	...
150,000	July 31	4	4	Croydon 4 p.c. Pref.	84—89	...
130,000	June 19	4	4	Do. 4 p.c. Deb.	90—95	...
65,000	Aug. 21	7½	7½	Eastbourne 'A' 5 p.c.	120—130	...
198,000	,,	6	6	Do. 'B' 3½ p.c.	103—113	...
112,312	,,	5	5	Do. 5 p.c. Pref.	100—105	...
130,000	June 19	5	5	Do. 5 p.c. Deb.	105—110	...
130,500	Aug. 10	7½	7½	Exeter New Ord. (£10)	13½—15½	...
24,000	Aug. 21	8½	8½	Gt. Yarmouth 8½ p.c. max. (£30)	24—29	...
59,400	,,	7½	7½	Do. 7½ p.c. max. (£30) ...	26—31	...
51,160	June 5	5½	5½	Do. 5½ p.c. Deb.	115—120	...
152,600	Sept. 4	9	8	Guildford Cons.	145—155	...
54,055	,,	5	5	Do. 5 p.c. Pref.	100—105	...
68,250	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
156,600	Aug. 21	7	7	Hampton Court Cons. ...	100—110	..
86,046	June 19	‡4½	‡5	Holyh'd&N.W.G.&W.Cpn.Ord.	13/6—15/6	...
80,000	Aug. 21	4	4	Lea Bridge 4 p.c. Pref.	78—83	...
60,000	,,	6	6	Do. 6 p.c. Pref.	113—118	...
94,876	June 5	4	4	Do. 4 p.c. Deb.	87—92	...
73,620	Sept. 18	8¾	8¾	Luton Cons. 'A'	150—160	...
107,960	Sept. 18	5½	4	Mid Kent Ord. (£10) ...	8—9	...
230,940	July 31	10	10	Oxford & District Ord. ...	145—155	...
47,112	,,	5	5	Do. 5 p.c. Pref.	95—105	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...
126,193	Oct. 30	7½	7½	Peterborough Ord.	134—139*	...
64,990	Sept. 18	7½	7	Redditch Ord.	110—120	...
166,850	July 31	8	8	Romford Ord.	110—120	...
60,000	,,	4	4	Do. 4 p.c. Pref.	95—100	...
44,000	Sept. 18	5	5	Do. 5 p.c. Deb.	105—110	...
25,570	July 31	5½	5½	Rugby 5½ p.c. Pref.	116—121	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	103—108	...
42,750	June 5	5½	5½	Do. 5½ p.c. Deb.	113—118	...
110,950	Aug. 21	8	8	Ryde Ord.	100—110	...
270,086	Sept. 4	7	7	Slough Ord.	120—130	...
21,000	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
28,872	Nov. 6	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	16/—18/–*	...
28,866	Sept. 18	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	16/6—18/6	...
117,228	Aug. 21	7	5	Swindon Cons.	75—80	..
60,425	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
64,380	June 19	5	5	Torquay & Paignton 5 p.c. Pref.	102—107	...
130,000	Aug. 21	8	5	Wakefield Ord.	101—106	...
81,650	,,	5	5	Do. 5 p.c. max.	81—86	.
82,000	July 31	6	6	Weymouth Ord.	101—106	...
273,626	Aug. 21	7	7	Wolverhampton Cons. Ord. ...	105—115	+5
98,384	,,	6	6	Do. 6 p.c. Pref.	113—118	...
160,000	June 19	5½	5½	Do. 5½ p.c. Red. Deb. ...	102—107	...
106,490	Aug. 21	5½	5½	Wrexham Ord.	89—94	...
90,000	June 19	5	5	York 5 p.c. Red. Deb.	102—107	...
133,640	July 31	6½	6	Yorktown (Cam.) 5 p.c. Cons.	112—117	...
120,000	,,	5	5	Do. 5 p.c. Pref.	100—105	...
35,000	June 19	5½	5½	Do. 5½ p.c. Deb.	110—115	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week
347,756	July 31	6	5	Bath Cons.	107—112	...
1,667,250	,,	5	5	Bristol, 5 p.c. max.	97—100	...
120,420	June 5	4	4	Do. 1st 4 p.c. Deb.	89—93	...
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	89—93	...
328,790	,,	5	5	Do. 5 p.c. Deb.	110—113	+3
274,000	July 31	5	5	Newport (Mon.) 5 p.c. max. ...	90—95	...
13,200	Sept. 4	8½	7	Pontyp'l Gas & W. 10 p.c. 'A'	12—13	...
13,600	,,	6	5	Do. 7 p.c. 'B'	10½—11	...
40,000	,,	6	5	Do. 7 p.c. 'C'	10½—11	...
140,778	July 31	5	5	Weston-super-Mare Cons. ...	93—98	...
64,338	June 19	4	4	Do. 4 p.c. Deb.	90—95	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	140—150	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week
157,150	July 31	6½	5	Chester 5 p.c. Ord.	100—103	...
92,500	June 5	4	4	Do. 4 p.c. Pref.	75—85	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	86—89	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—100	...
2,167,410	Aug. 21	6	6	Liverpool 5 p.c. Ord.	99—101	...
245,500	June 19	5	5	Do. 5 p.c. Red Pref. ...	90—95	...
306,083	July 17	4	4	Do. 4 p.c. Deb.	99—101	...
106,280	July 31	10	10	Preston 'A' 10 p.c.	174—184	...
188,219	,,	7	7	Do. 'B' 7 p.c.	126—136	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week
122,577	Aug. 21	8	8	Blyth 5 p.c. Ord.	146½—148½	...
732,000	Aug. 21	3	4	Hartlepool G. & W. Cn. & New	74½—76½	...
2,061,315	July 31	5¾	5	Newcastle & Gateshead Con.	17/9—18/3a	...
682,856	,,	4	4	Do. 4 p.c. Pref.	75—85	...
776,706	June 5	3½	3½	Do. 3½ p.c. Deb.	84—89	...
277,285	April 24	5	5	Do. 5 p.c. Deb. '43 ...	100—105	...
332,351	Aug. 21	6	6	Sunderland 6 p.c. max. ...	110—120	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week
542,270	Aug. 10	9	6	Derby Con.	110—120	...
55,000	June 19	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 19	5	5	Long Eaton 5 p.c. Pref. ...	9—11	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	100—105	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Nov. 10.	Rise or Fall on Week
10,000	Aug. 21	10	10	Great Grimsby 'A' Ord. ...	180—190	...
6,500	,,	10	10	Do. 'B' Ord. ...	180—190	...
79,000	,,	10	10	Do. 'C' Ord. ...	175—185	...
1,806,339	Feb. 20	6½	6½	Sheffield Cons.	120—123	...
95,000	July 3	4	4	Do. 4 p.c. Deb.	99—101	...

a The quotation is per £1 of Stock.
* Ex. div. ‡ For year.

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